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Journal of Electricity and Western Industry

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July 15, 1921

San Francisco

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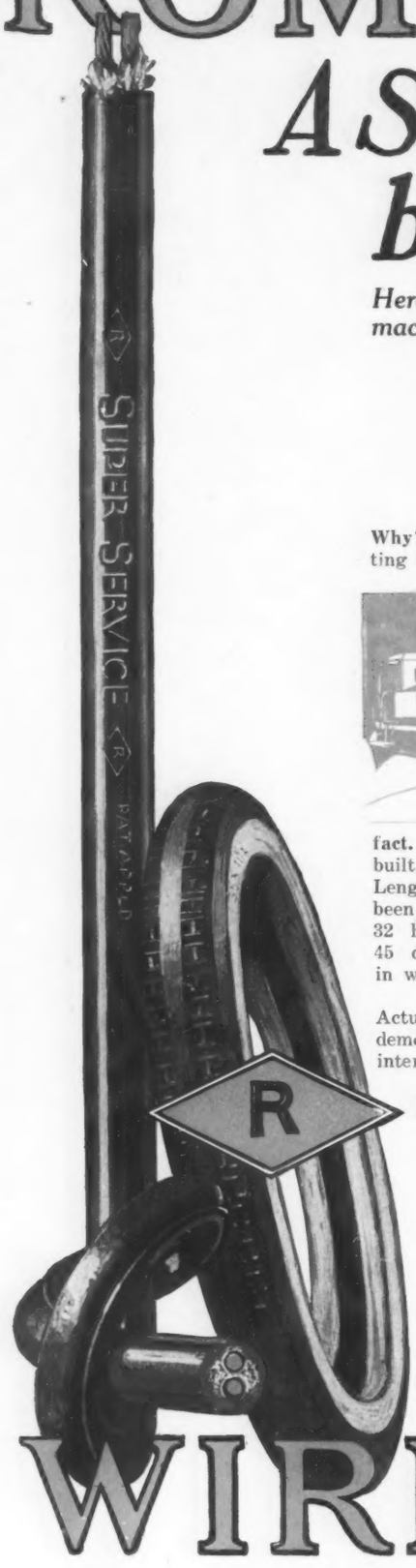

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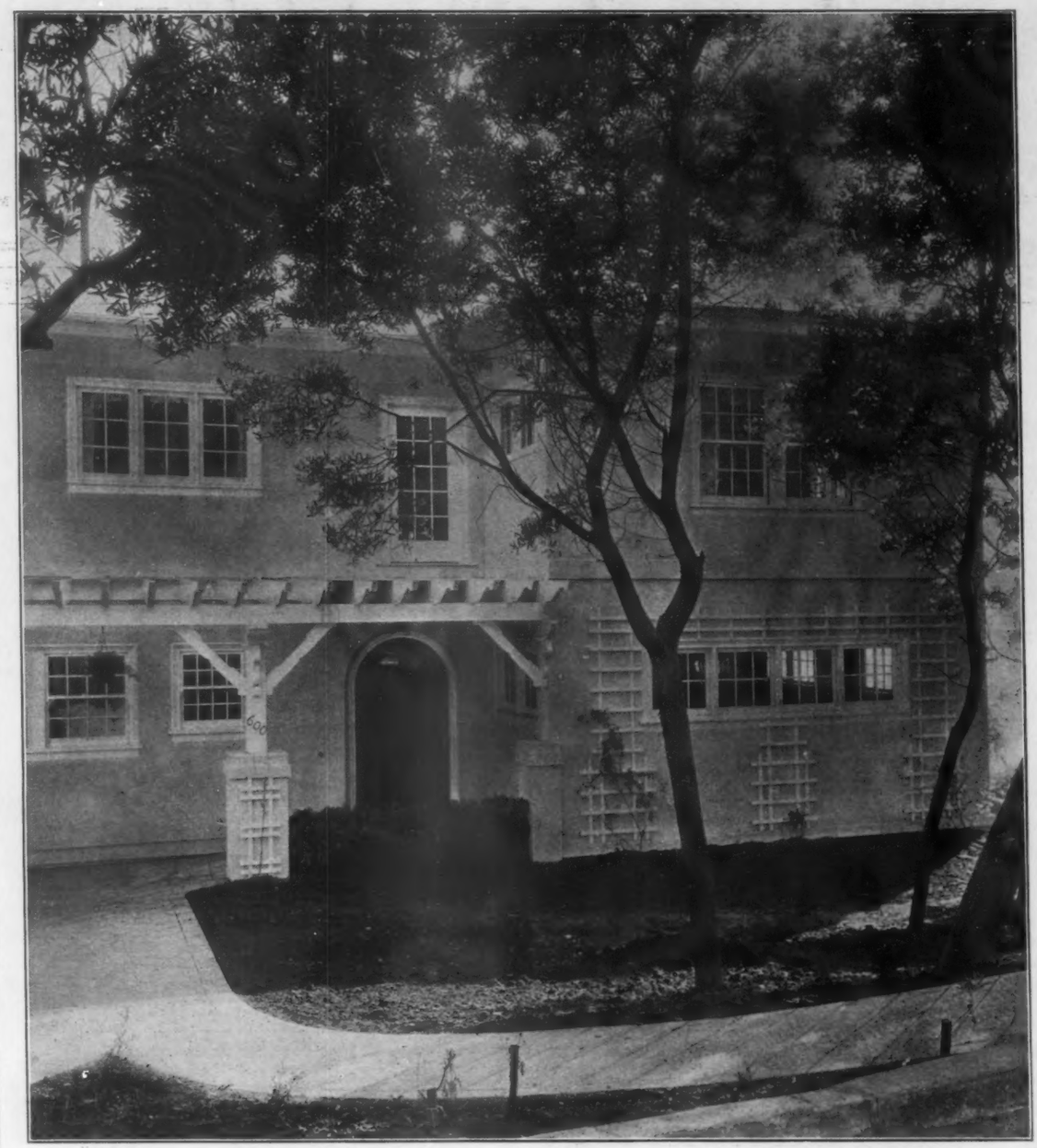

A New Electrical Home Record

THE fallacy of precedent was never more clearly demonstrated than in this beautiful home situated in Berkeley, California, and just completed by its owner, H. J. Gute. In the electrification of this resi-dence a number of innovations have been introduced, to the edification of many electrical men who said "It can't be done." Sixty circuits with two and a quarter miles of wire and one hundred and seventy outlets provide for the electrical service in this home. Still more distinctive are a 6000-watt fireplace, a 6000-watt automatic water heater, 20-ampere outlets in each room fed by 10-gage wire, exterior flood-lighting by four 300-watt lamps, and several cross-connecting switches. Great beauty and convenience are attained in both exterior and interior illumination. As the most completely electrified residence known, this is yet another indication of the place which good lighting and electrical convenience are taking in the home-building ideals of the West.

JUL 25 1921

Journal of Electricity and Western Industry

A publication devoted to the upbuilding of the great industrial West and the countries bordering on the Pacific

A McGraw-Hill Publication

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Interpreting Western progress through the application of electric power, light, and heat in industry and in the home

Vol. 47, No. 2 SAN FRANCISCO, JULY 15, 1921 Per Copy, 25 Cents

Urge the Lessening of Non-Taxable Securities

FOR some years prior to the war the non-taxable security, largely in the nature of municipal and improvement district bonds, while competing with the public utility securities, made little serious inroad into the field of finance of the public service industry. But the issuance of Liberty Loan securities and other tax free stocks and bonds to the extent of billions of dollars during the war period and since that time, has been a very serious impediment to present day financing. Particularly has this become true in connection with the income tax, where large investors may purchase tax free bonds and thus evade the carrying of a share in the burden of public maintenance or the paying of public indebtedness.

The easy availability of securities of this nature is creating an acute situation, unbalancing not only the just distribution of the public burden upon citizens generally, but retarding the financing of new work so sorely needed at the present time in the public service industry.

Franklin T. Griffith, president of the Northwest Electric Light & Power Association, in striking the keynote of the recent convention of his association at Portland, drove this point home most emphatically, and Journal of Electricity and Western Industry urges its readers throughout the West to see to it that the issuance of non-taxable securities in the future be materially cut down in volume, and thus make present day wealth or income meet its just tax burden.

Selling Lighting For the Home

At the present time industrial and commercial firms are seeking to cut down on all expenses, and as a consequence it is rather difficult to sell them better illumination. This leaves the home as the field which should be covered, and it is through the contractor-dealer that this idea must be put over. It is customary for the housekeeper to get renewals necessary for her home from the contractor-dealer, and he should take advantage of this opportunity to find out where and how the lamps that are being bought are to be used, and to recommend lamps of the proper intensity. Not only should the matter of lamps be taken into consideration by the contractor-dealer, but the question of proper fixtures should also be sold to the buyer.

It is possible for the contractor-dealers by selling proper illumination to teach the general public the advantages of better lighting, and when this is appreciated in the homes then it will not be a difficult problem to apply the same principles to the store or factory, as the public will be quick to sense the difference between proper and improper illumination. When the public as a whole demands anything it usually gets it, and the workman who goes from a well lighted home to a poorly lighted plant to work is bound to be disgruntled and dissatisfied, and will make himself heard. The proper place to teach correct illumination is in the home and now is the time for this to be done.

The West Leads in Street Lighting

With an average annual expenditure of over eighty cents per capita for street lighting, the West again has pointed the way to things electrical. Not only does the West lead in intensive use of electricity and in records in engineering achievement, but the cities of the West have been the first in the country to develop the idea of better street lighting. The average per capita expenditure for the United States for street lighting is seventy-one cents, and Montana leads all of the states in the Union with a per capita expenditure of $1.19.

Salt Lake City has recently ordered an extension of its "White Way" that is one and one-half times as large as the initial installation, and the "Path of Gold" in San Francisco was maintained by the Downtown Association of that city in spite of the fact that citizens composing this organization have felt the effect of the reconstruction period. Los Angeles is another example of a western city that has gone ahead with proper street lighting in its "Radiant Way."

Good street lighting should be installed in every city of the West, as it not only symbolizes the fact that electric power is making possible the advancement of the West, but it more than pays for itself. It has been proven that among the advantages that a "White Way" gives to a community are increased business on the street on which it is installed; it

decreases crime and robbery, attracts industries, promotes civic pride and in many other ways makes for a better community. The West should be proud of the fact that it leads in this movement and should strive to maintain its lead.

A Silent Argument for Better Lighting

A coroner's jury holds the lighting committee of the Board of Supervisors responsible for the death of Margaret Reilly, who was struck by an automobile the latter part of February on the north side of the panhandle of Golden Gate Park, in San Francisco. The woman, who was seventy years old, died later at the Central Emergency hospital from the injuries. The coroner's jury exonerates the driver of the machine, and states that the accident was due to the improper lighting of the street, and that other juries have recommended to the lighting committee that the street be lighted, which recommendation had been ignored. The jury, therefore, charged the lighting committee with negligence, and holds it responsible for the woman's death.

There is a deep and silent message in this report well worthy of thoughtful consideration, not only by lighting committees of municipalities but also by men of the industry in every line of human endeavor where human life is at stake, dependent upon the performance of duty.

Commercializing the Cooperative Campaign Idea

The electrical industry of the West has contributed to the standard of ethics of the nation one of the most valuable examples on record. A group of men have started out to endeavor to put over an idea in an educational way, so that the public might get a clearer conception of what electricity is doing for the upbuilding of the nation. The "Electrical Home" idea sprang up in California as one of the most direct ways of enlightening the public on the installation of convenience outlets in the home. The plan has proved a great success, and the public generally, and in particular architects and builders, have received a wonderful educational broadside. That no manufacturer or contributor to the campaign should endeavor to capitalize upon these electrical homes in any other way than through the broad general idea, was agreed to by all in this wonderful campaign. Particularly was it agreed that none of the apparatus, wiring devices, or appliances installed in the home should be considered as having been placed there as a particular award of merit for that particular manufacturer, but rather as an illustration of general quality service by the industry as a whole. It is well that these broad standards of ethics be maintained, and it is well that every branch of the industry see to it that they be not violated. In case of any violation retraction should be demanded, and if a second offense occurs, the full weight of the industry should be thrown into the affair to see to it that the public is properly informed on the situation.

Notable Advance in the Home Electrical

The installation of more convenience outlets in the home has been the great accomplishment of the year in the West in the matter of increasing household uses of electricity, and in months to come this increased use of the method electrical will be felt ten-fold where these installations have taken place.

It is difficult to give full credit to all those who took part in this constructive work, for practically every real worker in the industry has had a hand in it; but to Garnett Young must be given a full measure of credit for his pioneer paper before the Pacific Coast Section, N. E. L. A. Tracy Bibbins, too, who carried the idea to the manufacturers and others interested, must also be given a lion's share. And then followed the San Francisco Electrical Development League and the California Electrical Cooperative Campaign with the magnificent new idea—the home electrical—that has spread so rapidly over California, and has passed on to the nation as a whole to such an extent that in fully a dozen different states today the idea of the home electrical is being put over, and the necessity for convenience outlets is being impressed upon architect and house builder everywhere.

Significant of the great strides which this idea is making among western citizens as a whole, quite apart from organized effort, is the achievement depicted in the frontispiece of this issue—the most completely electrified home in the world. When the independent home builder himself conceives a home of this kind, the electrical industry may feel confident that its educational efforts are bring rich results.

The Oil Problem

There has been agitation recently for the carrying out of a survey of the United States in order to locate all possible oil sources. The urgency of this investigation is apparent when we realize that the proven resources of the country's oil fields as now known will be exhausted within twelve years, if the industries continue to use oil at the rate it is now consumed. No one can say, of course, that there are not vast reservoirs of oil still remaining under portions of the United States as yet innocent of the drill. The probability is against any large quantity of oil being discovered in this way, however. The Geologic Survey has long made it a part of its work to look for oil in any district where the geologic formations suggested the possibility of its occurrence—and the tremendous fortunes which have been made by the possessors of producing wells are sufficient incentive to have induced private enterprise to carry on similar investigations.

No one predicts that oil will actually be exhausted in this country within the next ten years—but what is a safe conclusion is that oil has probably reached the maximum extent of its use. Indeed, the pressure which will come from those industries using the higher priced derivatives of petroleum must tend

to keep up the price of crude oil, thus restricting its use wherever a substitute is possible and mechanically lengthening the life of the oil fields.

This is the situation which the electrical industry faces. At the present time there is a considerable block of power generated in oil-operated plants in the West, particularly in California. The actual amount of oil consumed is not large, perhaps, nor is the power generated an important factor as compared with that generated by water power. It is obvious that the future can allow practically no increase in oil consumption, however. More efficient methods, perhaps the substitution of Diesel engines for present equipment, may enable the power companies to make more out of what is obtainable. The future power supplies of the West, however, must come from some other source. Neither coal nor wood waste at present can compete to any great extent with water power generation—and no other fuel appears immediately available.

These same factors apply to industry at large. Something like thirty per cent of the oil production of California is used by the railroads at the present time, and an equal amount in various manufacturing enterprises. Inevitably the amount used in both of these fields must be cut down. The handwriting on the wall as it is decipherable at the present time points to hydroelectric energy as the major source of power for the future industrial growth of the West. It is this service which the public service industry of the West must prepare itself to render.

Control of Foreign Shipments

At a recent meeting of the California Industries Association, A. F. Haines, vice-president and general manager of the Admiral Line, brought out a very important point—a way in which our manufacturers can assist American shipping. Under the present method of procedure an American firm purchasing equipment, apparatus, or supplies in foreign countries is quoted a price by the foreign seller C. I. S. This means that the local purchaser has the goods delivered at his door, freight and insurance prepaid, and he is thereby relieved from any trouble or inconvenience in securing them.

Conversely, when the foreign buyer comes to the United States to make his purchases he is quoted a price F. O. B. factory. The local manufacturer does not wish to be bothered with the care of securing space for a trans-Pacific shipment, arranging for the insurance, consular records, etc. And therefore, to make it easy for himself, he quotes F. O. B. factory.

In both cases the trans-Pacific shipment of the merchandise is in the control of foreigners. Their natural preference then for shipment will be in ships which sail under their own native flags. This, therefore, works to the disadvantage of American shipping.

To all good Americans, therefore, it would seem that in either case, whether purchaser or seller, the American firm should control the shipment and thus be in a position to specify the trans-Pacific carriage in American ships.

Need for Improved Stokers in Northwest

It has been estimated that there is available in possible uses of hogged fuel in the Northwest an annual energy totaling something like 3,500,000,000 kw-hr. Of course a great portion of this vast amount of energy could never be made use of. However, the constant and increasing demand for this type of fuel in the various central stations, as well as in many of the isolated installations of the Northwest, calls today for improved stokers. Stokers designed for firing coal do not give enough air for proper combustion when used on hogged fuel. It is well known, however, that stokers now in use give greater boiler rating while they last than is possible when hogged fuel is burned in a Dutch oven—which is invariably the way this type of fuel is burned throughout the Northwest. In discussing this matter with practical engineers in that territory the report always comes back that experiments and tests in connection with the burning of hogged fuel, including experiments with stokers, show that there are economies to be effected by the use of stokers for firing hogged fuel, but that a stoker designed especially to meet the requirements of this particular type of fuel is necessary. Attention is called to this fact editorially in order that thought may be given to a more efficient use of hogged fuel in the Northwest, in order that the cost of production may be lowered in the steam electric generating plants of the West.

Some Rural Needs

The various flying squadrons that have gone out from cities of the West to the rural towns and villages have developed a healthier feeling between the country districts and the city districts, and at the same time have had called to their attention several outstanding instances wherein the country is lacking today and in which the city may be of assistance. Thus in certain parts of California it is found that the savings banks in small rural communities have been tied up in agricultural loans such as financing the rice owners, the cotton growers, and so on. And, too, wonderful as our western roads are, cross country laterals are lacking, hotel accommodations are insufficient in many of the smaller towns, and in fact in some of them do not exist at all. Tourists will not travel in such districts, for most of the tourists who visit the West today are people of means, and are accustomed to the best that there is. More money is needed for water development, and for power development, and in many rural communities large land owners occupy practically all the available land, while lack of enterprise prevails in others.

There are today powerful cities in the West that rank well up among the very best of their kind in the nation, and these cities, in order to contribute their full usefulness and helpfulness to the nation, must see to it that the back country, or rural districts, upon which they are so dependent for sustenance and growth are properly financed and developed to meet the needs of the day.

Western Comment on Current Events

Editorial Notes and Readers' Views on the Outstanding Aspects of Financing, Trade Promotion, Legislative and Associated Topics that have a Special Bearing on Western Business

Western Utility is the Second Largest in United States

Pacific Gas & Electric Company with Thirty-four Millions Gross Revenue Is Exceeded Only by Commonwealth Edison of Chicago

The financial showing of the Pacific Gas & Electric Company is of especial interest to Western investors, as approximately $105,000,000 worth of its stocks and bonds are held locally by more than 30,000 private investors, savings banks and other fiduciary institutions. The amount available for the payment of fixed charges was $11,935,235, or 2.4 times all interest charges. After paying the regular 6% dividend on the preferred stock there remained a balance of $2,142,026, and the common stock dividend was earned with a margin of $441,180. The annual report of the company just published shows that the gross operating revenue for the year was $34,475,372, and that for the Commonwealth Edison Co., of Chicago, $35,317,134.

The company's contribution to the upbuilding of the material resources of the state and the development of its agricultural, mining, manufacturing and other basic industries is indicated by the fact that it has either completed or will complete at an early date, 138,741 hp. in additional hydroelectric energy, and 16,756 hp. of additional energy from its steam plants. In this and other new construction the company expended $11,314,609 during 1920. In pursuance of its policy of maintaining its properties in first-class physical condition there was expended for maintenance during the year $2,740,210, in addition to a reserve against depreciation of $1,788,302. The net working assets are reported as $12,503,084, an increase of over a million dollars compared with that at the close of the preceding year.

The most important incidents of the year as reviewed by John A. Britton, vice-president and general manager, are:

January 1, 1920—Merging into P. G. & E. system of the leased property of Sierra and S. F. Power Company.

January 1, 1920—Commencement of second circuit on Wise towers from Newark to Wise Power House—170 miles, completed January 1, 1921.

June 1, 1920—Commencement of work on Hat Creek Plants Nos. 1 and 2, installed capacity 33,512 hp.—to be completed July 15, 1921.

July 1, 1920—Commenced work on steam turbine in Station "C," Oakland—16,756 hp.—completed March, 1921.

July 1, 1920—Commenced work on high pressure gas transmission lines from Sacramento to Woodland.

July 10, 1920—15 per cent surcharge on electric rates granted by Railroad Commission.

July 24, 1920—General increase in gas rates and establishment of fixed schedules.

August 1, 1920—Commencement of work on 10,054-hp. hydroelectric plant at Spring Gap, on Stanislaus River, to be completed July 15, 1921.

October 15, 1920—Tie-in with system of San Joaquin Light & Power Corporation.

October 27, 1920—Completion of Spaulding Plant No. 2—1,341 hp.

November 1, 1920—Commencement of work on Pit River Plant No. 1—93,834 hp.—to be completed in spring of 1922.

The company has made an exceptional showing both financially and from the viewpoint of service to the consumers, of whom there were 569,360 at the end of 1920. The electric energy sold during the year amounted to 789,922,625 kw-hr., an increase of almost twenty per cent over that sold during 1919.

Western Newspapers Urging Power Company Support

Wide Understanding of Industrial Needs of West Shown in Response from aily Press as Result of Del Monte Conference

The recent industrial conference at Del Monte, held under the auspices of the Pacific Coast Division, N. E. L. A., is having its effect throughout the West. The industrial data presented at that conference was featured in some 250 different newspapers of the West, and in many instances occupied the front columns of the paper with double-column scare-heads. The average length appearing in a newspaper covered something like a column. The editorial comment that has been brought out has been extremely gratifying. The clear vision of western needs brought out in the editorial which appeared in the Fresno Republican on June 21, 1921, under the heading "Fiat Lux," is typical:

"We must get closer in touch with the men who belong to this industrial priesthood of light. We must understand what they are doing for us, as well as for themselves. We must understand their ideals, and their practical plans. We must know what they are doing with copper wires, with stone, with poles and with the money that is needed to buy these things. We must know how to get this money, whose money it is. As far as possible, we must encourage the putting of money into these things.

"As far as possible, this should be our money. We should realize that it will be for the better working of this light and power system that enters into all our homes, if it is our money that turns the wheels and catches the water, and conducts it through the great tubes. It will be much better if it is our money that guarantees the bonds with which

these enterprises are financed. In spite of the people who talk vaguely about financing and having someone else do something, it is far better if these things are 'owned' and owned right here in the San Joaquin Valley of which we are a part.

"This is not a stock sale appeal for the San Joaquin Light & Power Company, or for the Southern California Edison Company, or for the Pacific Gas & Electric Company. We would not object if it were.

"This is an attempt to help the people of Central California realize that their present and their future happiness rests in part on their participation in the ownership of these corporations. And to make them realize that their happiness and prosperity depend in part on the faithfulness, the sagacity and the corps spirit of the men in the electrical business, and to encourage them by an understanding and an appreciation of their problems.

"The life that we are leading is a very dependent one. We know how much we depend on the farmer, on the merchant, on the professional man. We are not always conscious of what we owe to the engineer and to the promoter.

"The divine command, 'Let there be light,' did not lose its efficacy, when it was uttered on the fourth day. And it was addressed to all of us, now, as well as then."

Industrial Advertising Conference Proposed

Movement Started to Fill Gap in Associated Advertising Clubs' Conventions — Eastern Associations Initiate Movement

While industrial advertisers were conspicuous by their absence at the Atlanta convention of the Associated Advertising Clubs, those who attended launched a well defined movement to put industrial advertising "on the map" in future conventions. The Engineering Advertisers' Association of Chicago and the Technical Publicity Association of New York form the nucleus of the movement which all industrial advertising interests will be invited to join. It was the unanimous opinion of those present that more attention should be given to industrial advertising and that definite plans should be made to put on an attractive program in Milwaukee in 1922. It is the intention to put on a program that will be helpful to the advertising manager of the industrial plant, both large and small. The importance of promoting the movement of goods from industry to industry and the wide field for industrial advertising are well understood. Western agricultural products are known the world over, and an extended market has resulted through the use of national advertising. With this conspicuous example before them the Western manufacturers should take an active interest in the convention of the Associated Advertising Clubs and the special features that will be included in the next annual convention.

Japan Facing a Fuel Shortage

Oriental Correspondent Reports Extensive Hydroelectric Development as Fuel Conservation Measure in Japan

Cruse Carriel, formerly associated with Journal of Electricity and Western Industry but now acting as Oriental correspondent, writes interestingly concerning the intensive power program that is under way in Japan. In brief, Mr. Carriel says:

"To facilitate the growth of the manufacturing industry in Japan, the Japanese government proposes to systematise the installation and operation of hydroelectric plants, which on one island alone, it is estimated, will increase the output from 1,300,000 horsepower to 7,500,000 horsepower. The Department of Communications has been provided with an appropriation of 67,000 yen for preliminary surveys.

"At the end of February the number of companies engaged in the production of electricity was 820, capitalized at Y1,318,617,000 and operating steam and hydro plants which produced 1,399,440 kilowatts.

"Japan's domestic fuel situation is such as to make the development of hydro-electricity generation almost imperative. The deposits of eight billion tons of coal will be exhausted within half a century, it is estimated, and at the same time the electrification of the railroads seems to be the only remedy for present high costs of operation, according to experts.

"As a preliminary to the initiation of the contemplated program of development, a number of amalgamations of hydroelectric projects have been effected and more are in process of being effected. Plans at present contemplate dividing Honshy, the main island, into four districts.

"The Ou district has a present generating capacity of 85,000 horsepower at its 86 installations, which it is expected to increase by 668,000 horsepower by 400 additional plants. In Kwanto district, 184 plants produce 768,000 horsepower, which it is proposed to increase to 2,530,000 horsepower by the establishment of 560 plants. Kwansai's 153 installations now produce 270,000 horsepower, which is to be increased to 1,912,000 horsepower by the addition of plants at 400 points. Chugoku now generates 84,000 horsepower with 63 establishments, to which number will be added 160 plants producing 238,000 horsepower."

Industrial Survey Planned by Salt Lake City

New City Planning Methods Taken Up By Commercial Men of Utah Metropolis to Further Local Industrial Development

The achievement of a unified western development toward which each district will contribute those elements for which its location and characteristics best fit it, has long been the aim of Journal of Electricity and Western Industry. The first step toward the accomplishment of this end is undoubtedly the industrial analysis of the possibilities of each local community. Salt Lake City has recently joined the ranks of the western cities who are undertaking this task, through an industrial survey which is being conducted under the direction of the Commercial Club.

The subjects which will be studied and outlined include railroads, highways, streets, street and interurban railways, utilization of land, freight rates, development of industry in conformity with proximity of raw materials, industrial terminal, development of surrounding territory, power, water system, grade crossing elimination, housing for employes, labor, irrigation and drainage. After the survey is completed a general plan will be outlined whereby the city will be able to make the most rapid advancement in an industrial way.

The work is in charge of M. O. Bicknell, of the industrial department of the Western Pacific Railroad, assisted by J. E. Light, of the Southern Pacific, F. E. Morris, secretary to the city commission, D. Carlos Kimball, president of the Salt Lake Real Estate Board, and Markham Cheever, chief engineer of the Utah Power & Light Company.

Delegates at the recent convention of the Northwest Electric Light &

Northwest Electric Light & Power Association Convention

Methods of Establishing Better Public Relations and Cooperation Within the Industry Featured at Enthusiastic Portland Gathering of Light and Power Men of the Northwest

The need for a better understanding between the public and public utilities and a discussion of means of bringing about a more desirable situation in this respect, occupied the major portion of the time of those attending the fourteenth annual convention of the Northwest Electric Light and Power Association (geographic division of the N. E. L. A.), held in Portland, June 15 to 18.

"Fair dealing with the public served," said Franklin T. Griffith, president of the Northwest Association, in his presidential address, "is the only means of securing the good will of the public which is absolutely essential to the prosperity and growth of public utilities. Good will can be secured in return for adequate service at reasonable rates, and every effort should be put forth by men engaged in our industry to cultivate and increase the confidence of the public in public utilities." Mr. Griffith called attention to the constructive work done along these lines by the legislative committees in the various states embraced in the Association. "They have faithfully and completely discharged their duties and by their straightforward and conscientious presentation of facts to the representatives of the people in the various state legislatures have aided in procuring helpful legislation and in defeating much that might have been harmful. The success of our legislative committees has been due to a strict observance of the policy of the Association to stand for a square deal, and a square deal only. This policy, coupled with the steadily growing public belief that unduly burdensome legislation directed at public utilities is certain to react to the disadvantage of the public served, is creating the conviction that the best interests of the people are subserved by according fair and equitable treatment to the utilities."

The question of finance, Mr. Griffith pointed out, is one of the most interesting and important considerations facing utilities today. "The growth of the industry is necessitating a constant addition to the facilities for service and as limitations are placed upon utility earnings by the commissions, the funds necessarily required for expansion of facilities cannot, except in small part, be provided from earnings, and it is therefore necessary to finance improvements and betterments with outside capital secured through the sale of the utilities securities."

Local Stock Sales Important

"Financing of utilities through the sale of stock locally," said Mr. Griffith, "would be of incalculable benefit to the industry and of hardly less value to the people of the community served, and would materially assist the utility in establishing and maintaining that spirit of confidence and good will so essential to true cooperation."

Education Necessary

A nation-wide campaign to educate the American public in the increased uses of electricity and also on the manner of conduct and control of public service corporations is on the verge of being launched, according to M. H. Aylesworth, executive manager of the National Electric Light Association, who spoke on "The National Electric Light Association." Methods to be employed in bringing the public to a closer understanding of the problems of the electrical world through publicity, advertising and direct communication, and the reasons why such education was imperative, were dealt with by Mr. Aylesworth. He said in part: "The average consumer does not realize the share he holds in public utilities over and above his municipal interest in them. The 27,000 banks throughout the country backed by 29,000,000 depositors have assets in public utility securities amounting to $1,700,000,000, or an average of $63.00 to each depositor. Insurance

Power Association grouped in front of the Multnomah Hotel, Portland, Ore.

companies likewise hold $300,000,000 in such investments, and in every payment of insurance premiums the receiver gets a portion of the earnings of his own public service corporation. In view of the facts, it develops that the average citizen has quite an interest in public utilities."

Would Aid Back to Farm Movement

The solution of the back to the farm movement, a problem which is occupying the attention of the business men of the country, in the opinion of Mr. Aylesworth, lies in the more complete electrification of the country homes. There are 2,000,000 country homes in the nation electrified at the present time, and 4,000,000 more which if supplied with electric service, would give the farmer's wife all of the comforts now enjoyed by the woman of the city, and prove a great stimulus to the "back to the farm movement."

Functions of the Utility Commission

The functions of federal and state regulatory bodies over public service corporations and the relations between producer and consumer of electricity constituted the address read by E. V. Kuykendall, director of the department of public works for the state of Washington. To establish good will between such bodies, corporations and the public, was the most important project confronting the electricity producer, he pointed out. He said there are two influences that militate against justice to utilities—the ancient prejudice against corporations and the natural element of selfishness which sometimes dominates the consumer. He believes there are indications everywhere that the day of a better feeling and understanding between the public and the utilities is dawning, and the best way to hasten this understanding is to educate the public into the manner of governing, regulating and fixing the rates for public utilities, even if it is necessary to incorporate such education in the public schools. Discourteous treatment of the public by company employes and lack of diplomacy should be classed, in his opinion, with incompetency as a cause for dismissal. It is his belief that good will advertising is largely valueless unless it explains the fundamentals of rate-making, valuation and accounting.

Cooperation Essential

The importance of cooperation between the various branches of the electrical industry and the good that will accrue from a better understanding of problems and needs of each branch by the others, was discussed by Stephen I. Miller, the newly appointed secretary-manager of the Association, who made it clear that it was not intended to conduct merely a campaign but that a long period of steady growth was desired, and that results must not be expected too soon. Others who spoke were G. L. Myers, on "Winning Public Support and Confidence"; Robert Sibley, who spoke on "Western Industrial Development"; C. E. Driver, whose subject was "Public Utility Securities," and L. T. Merwin, who dealt with "The Essentials of Power Development."

Entertainment

The convention guests were entertained by scenic drives, parties and teas for the ladies, and tours of inspection and golf for the men. The "Kilo Watt" golf cup was won by Prof. R. H. Dearborn, of the Oregon Agricultural College. A bag for golf clubs was awarded by E. F. Whitney of the General Electric Company for the low gross score.

Election of Officers

The annual election of officers resulted in the election of W. R. Putnam, vice-president and general manager of the Idaho Power Company, president, and for vice-presidents: J. M. Kincaid, for Washington; I. E. Rockwell, for Idaho; P. M. Parry, for Utah; and G. L. Myers, for Oregon. C. M. Brewer, L. A. McArthur and L. B. Faulkner were elected members of the executive committee.

PRACTICAL ELECTRICITY SERIES

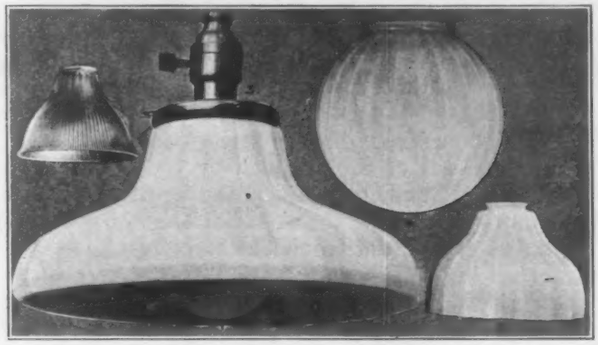
The material published in these pages under the title "Problem Course in Electricity," by H. H. Bliss, is now being collected and will shortly be issued in book form. Some additional matter, including problems and diagrams, will be added to make the volume an inclusive practical text book.

Selecting the Right Lamp for the Commercial Lighting Fixture

How to Maintain a High Standard of Illumination in Your Business Plant by Choosing the Right Lamp to Fit the Fixture When It Comes to Renewal

BY W. H. RADEMACHER
Engineer, Edison Lamp Works, General Electric Company

Much discussion has been devoted in the past to the question of proper illumination of commercial establishments, both from the standpoint of quantity of illumination desirable, the general application of lighting units, and artistic considerations. That good illumination is essential, and an important exponent of better merchandising, is generally conceded. How-



Figs. 1, 2, 3 and 4

ever, for the maintenance of a high standard of lighting there also are after considerations to which we must give careful attention.

Lamp Replacements

Maintenance is such a factor, and under this head comes the subdivision — lamp replacements. This, to many, is a seemingly small matter, but unfortunately the small matters are the ones which are either most frequently neglected or abused, and this is one which has a decidedly important bearing on the preservation of good illumination. It should be a comparatively easy matter to make proper replacements, for if we start with a unit of the correct size, in making our substitutions we have but to observe the rating of the initial equipment and duplicate it. While this procedure is sometimes religiously followed out, there are many times when it is not adhered to, a guess simply being made as to the proper size lamp. This results in the selection of a unit too large or too small. Frequently in the effort to increase quantity of illumination a larger lamp will be employed, and while a greater quantity of light sometimes results from such changes, it is possible that this gain will be offset by a sacrifice in quality which further may seriously mar our entire lighting effect.

While it would be convenient to have a table from which to pick off the size of lamps to be used in given fixtures under given conditions, it is impracticable to give a specific tabulation such as this because of the wide range of sizes in which commercial units are built, and the variations in intensities that are encountered, depending upon store structure, character of merchandise and similar factors. When the initial planning of a lighting installation is carried on, a lamp is chosen which will give a sufficiently high intensity and a fixture is chosen which will give us suitable distribution of light and the element of decoration which is desired. The size of the fixture is a function of the lamp size and it is, therefore, all important that care be taken that the proper initial wattage be installed. When replacements of lamps are made, the fixture being a fixed quantity dictates the size of unit which is going to be employed, and, as will be pointed out later on, it is not always possible to change the size of lamp and still maintain standards of good illumination.

The following tabulation indicates in a general way the range of lamp sizes for which given characteristic units are designed.

General Type of Fixture	Diameter of Reflector Inches	Recommended Size of Lamp Watts	Bowl Finish
Deep Bowl— Prismatic Glass (Figure 1)	8 8⅝ 10¼ 12 14	75 100-150 200 300 500	Bowl Enameled
Deep Bowl— Opal Glass (Figure 2)	6 7 8 10 12 14	25, 40, 50 50, 60 75, 100, 150 200 300 500	Bowl Frosted or Enameled
Shallow Bowl— Opal Glass (Figure 3)	7 9 11 15	25, 40, 50 50, 60, 75 100, 150 200	Bowl Frosted or Enameled
Round Opal Glass Enclosing Globe (Figure 4)	8 10-12 14 16	75 100, 150 200 300, 500	Clear
Shallow Opal Glass Enclosing Globe (Figure 5)	12 14 16	75, 100, 150 100, 150, 200 200, 300, 500	Clear
Light Directing Glass Enclosing Globe (Figure 6)	14 17 20	100, 150 200, 300 300, 500	Clear
Semi-Enclosing Metal and Glass (Figure 7)	Top Bowl 16 8¼ 19 11½ 23 14½	100-150-200 200-300 500	Clear
Deep Bowl—Opal Glass—Semi-Indirect (Figure 8)	11 14 16	75-100-150 200-300-500 750-1000	Clear
Glass Enclosing— Semi-Indirect (Figure 9)	14 16 18	100-150 200 300-500	Clear
Glass and Metal— Semi-Indirect (Figure 10)	12 14 16	100-150 200 300-500	Clear
Totally Indirect Mirrored Glass (Figure 11)	9½ 12 16	100-150-200 300-500 750-1000	Clear
Totally Indirect Enameled Steel (Figure 12)	15 22	100-150-200 200-500-750-1000	Clear
Angle-Mirrored (Figure 13)	8 10	75 100-150	Clear
Angle-Prismatic Glass (Figure 14)	10⅜	100-150	

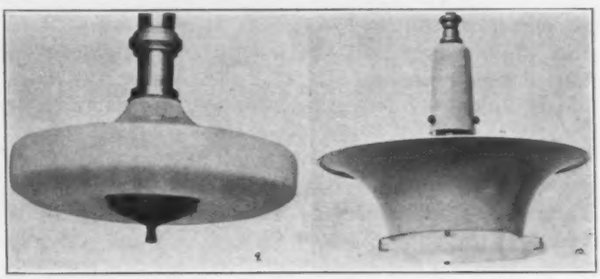
Choosing the Right Lamp for the Right Reflector

Most good reflectors are designed to be used with a particular size lamp having certain standard dimensions. To obtain satisfactory illumination we must use the right lamp in the right reflector. Let us consider why we should choose the right lamp and what happens when we do not.

Figs. 5, 6 and 7

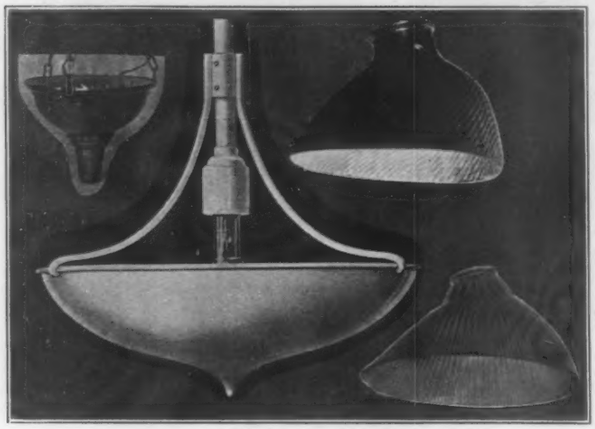
Many commercial establishments, particularly those in which comparatively old equipment is being used, are illuminated by direct lighting, employing reflectors of the open-mouth type. With such units when clear lamps are employed, there is usually some position from which the lamp filament may be viewed, and as a consequence of which eye discomfort is likely to be produced. Since the primary purpose of illumination is to aid us to see and to see comfortably, every effort should be made to choose lamps which will produce illumination of the most favorable character. For attaining this end in such instances we have at our disposal the bowl frosted and bowl enameled lamps, which conceal the lamp filaments quite effectively, improve the diffusion of light and make for a much better appearance in our lighting system. The frosting treatment is suitable for lamps having ratings of 75 watts and below. For units larger than that, because of the high intrinsic brilliancy of the light source which we have in the Mazda C lamp, the bowl enamel treatment should preferably be resorted to. In open mouth reflectors an undersized lamp results first of all in a decrease in quantity of illumination due to reduction in size of lamp and a further decrease in illumination due to the fact that the small lamp will not be located properly with reference to the reflecting surface. Seldom, if ever, is an installation encountered where a reduction in size of lamp from original is justified, but far too many lighting installations are open to criticism in that sufficient wattage has not been provided for. On the other hand, with a reflector of this type, where an effort is made to increase the quantity of illumination by use of a bigger lamp, difficulties are usually encountered which more than offset the slightly higher intensity which is thus secured. The reflector is usually designed to house a lamp of a given size, and when properly chosen will effectively conceal the filament and properly diffuse and reflect the light rays. If too big a lamp is employed, however, the bulb will usually project beyond the end of the reflector, meaning that the filament will be distinctly visible, resulting in glare and a very displeasing appearance. This means that eye discomfort is produced and the inherent beauty of the fixture is greatly reduced. Also, when the light center is changed in this manner, that is, when the position of the filament with reference to the reflecting surface is modified, the value of the reflector as such is greatly reduced, the light is not properly controlled and consequently efficient reflection and satisfactory diffusion are not had. In other words, we consume energy to generate light which is wasted.

Fig. 8



Figs. 9 and 10

With the enclosing type unit considerable will be sacrificed if we do not use proper care in making our lamp selections. While the troubles are perhaps not quite so great, they are still sufficiently undesirable to be avoided. With a lamp too small we again encounter the evils of an inadequate intensity. Poor



Figs. 11, 12, 13 and 14

distribution likewise results and the reflective value of the unit is not fully utilized. Too large a lamp will mean too high a surface brilliancy in the glassware, or, in other words, glare. Changing the position of the light center may bring the filament into such a position within the glassware that it will be unevenly illuminated, and improper distribution will result; or, if the glass is of a light density, the filament of the lamp itself may be visible.

In semi-indirect and totally indirect units troubles encountered due to improperly re-lamping are quite similar. The use of a smaller lamp than that for which the glassware was designed means a reduction in illumination intensity, a decrease in the reflecting efficiency, a marring of the beauty of the glassware, in the case of a semi-indirect unit, and, sometimes because the lamp is raised to a higher position, the visibility of the light source from positions where it should not normally be seen. The resultant change in light distribution may be such that the light cut off will be objectionably affected, that is, a distinct line of demarkation between upward and downward light may occur along the wall or ceiling where it will look bad. In the semi-indirect unit where some light is transmitted directly downward, the increase in size of light source may raise the brilliancy of the glassware to an objectionable degree.

In lamp selection the question also sometimes arises as to whether the daylight lamp or regular Mazda lamp is preferable. In this regard it may be said that the daylight lamp should be employed only when it is desired to distinguish colors in approximately their true value, or where a distinctive illumination, simulating daylight, is required.

In choosing a lamp we should select the right one to give the proper intensity, to give suitable eye comfort and light distribution, and to maintain the proper artistic appearance of reflecting equipment.

All Commercial Groups Should Back Power Program

Why the Future Development of Western Industry Is Bound Up with Power Development Program

BY CHARLES HESTON PEIRSON
Southern California Edison Company

With part of the State a little behind, and the remainder of it barely abreast of the demand for power, which is fundamentally and absolutely essential to make it possible for factories to locate here, or for semi-arid land to be reclaimed and put under intensive cultivation, Chambers of Commerce can no longer pursue the work which they have so magnificently performed for years, unless the electric companies are able to keep at least one lap in advance of public necessity with their power development.

What commercial bodies can achieve if the companies can continue to develop a sufficient amount of hydroelectric power can be concretely demonstrated.

Applying the personal interest principle to its charted development program, contemplating bringing into service a minimum of 50,000 horsepower of hydroelectric energy for a number of years, the Southern California Edison Company has prepared statistics which will be most helpful to the executives of commercial bodies in planning their activities. This 50,000 horsepower of new development annually, applied to the diversified uses of the people in the counties of Los Angeles, Orange, San Bernardino, Riverside, Ventura, Santa Barbara, Kern, Kings and Fresno, is found to be adequate to provide for their upbuilding as follows:

It will create an annual growth in community wealth amounting to $300,000,000; over $100,000,000 will be expended for new homes, $125,000,000 for offices and mercantile establishments, $25,000,000 for manufacturing plants, $23,000,000 for general civic improvements, such as roads, highways and transportation facilities; $15,000,000 for electric generating and distributing systems; $7,000,000 for improvements to farm lands; and $5,000,000 for extensions to electric railways.

To community expansion these expenditures will mean an annual increase in population of 100,000; new homes, 20,000; acres of land brought into cultivation by electric power, 65,000; factories, 320; and the employment of 8,000 more industrial workers. It will require for this increase in business the equivalent of ten more banks, nineteen more clothing stores, sixty-eight offices, thirty-five restaurants and cafes, thirty churches, and twenty-six more schoolhouses.

To the individual business, 20,000 new homes will mean the expenditure in building sites of $15,500,000; for carpenter work, $15,500,000; for lumber, $14,000,000; for mill work, $13,850,000; for plumbing, $7,720,000; for contracted jobs, $7,700,000; for brick work, $4,850,000; for painting, $4,250,000; for electric fixtures, $2,430,000; for nails and hardware, $2,400,000; for roofing, $2,350,000; for concrete, $2,330,000; for hardwood floors, $2,320,000; for plastering, $1,850,000; for lath and plaster, $1,230,000; for cellars, $950,000; and for mantels, $770,000, making a total in the increase of individual business of $100,000,000.

The magnificent work which commercial bodies have been doing for California for the past two-score years will be quickened by power development. They can now send new and authentic literature to eastern manufacturers, who realize that in the countries bordering the Pacific dwell three-fourths of the population of the world, offering the greatest of markets for American ware. They can now bear witness to the economies involved in building factories nearer to the Pacific coast; and they can vouch for the perpetual supply of cheap power insured by unfailing water sources. Chambers of Commerce and Boards of Trade can now assure home-seekers that land irrigated by electrical pumping can be continually productive, and therefore secure and profitable.

The members of these commercial bodies are the capitalists, the merchants, the manufacturers, and the agriculturists of their respective districts. These members who are the bone and sinew of many communities have it within their power to speed up the development of hydroelectricity by becoming financial partners in these enterprises, with the knowledge that their investment in hydroelectric construction is increasing the production of electricity, which is the life blood of prosperity.

Delegates at the Salt Lake City convention of the A. I. E. E.

Power Transmission Problems Discussed at Salt Lake City

Engineering and Economic Problems of Long-Distance Power Transmission and Interconnection Receive Particular Attention at the Combined Annual and Pacific Coast Convention A. I. E. E.

June 21 to 24 were important dates for the western members of the American Institute of Electrical Engineers, as for the first time an annual convention of the Institute was held in a western city. Not only was the thirty-seventh annual and the tenth Pacific Coast convention held in a city in the western portion of the country, but, as was to be expected, the Salt Lake City convention was dominated by the western spirit, and, to a large extent, the problems of the economic transmission of large blocks of power over long distances, power-factor control, prevention of harmonics, insulator problems and the effect of corona, which were dealt with in detail, are typical of western power problems.

On the opening day, Tuesday, June 21, Charles R. Mabey, governor of Utah, delivered an address of welcome, and the president, Arthur W. Berresford, gave the annual presidential address. In his address, besides touching on the essentials of research, which must always form the basis of engineering development, he discussed with broad vision the commercial engineering responsibilities which engineers are now realizing they must assume. In considerable detail he outlined his conception of the proper sphere of activities of such bodies as the U. S. Bureau of Standards in order to eliminate misunderstandings and to correlate in an effective way the work of such bodies with that of corporate and university laboratories in the interest of the public.

Long Distance Transmission

The discussion of the papers of the symposium on long-distance transmission by Messrs. Baum, Lewis and Elden, and on the papers dealing with related subjects by Messrs. Whitehead, Skinner, Peters Lee, and others, brought out the relationship between the engineering and economic problems in the transmission of electric energy in large quantities in order to meet the requirements of future service. The subject of line regulation was considered of greatest importance. That there is sufficient information at hand, as the result of the study of line insulation and related problems, to justify confidence in handling many problems of inductive interference and to achieve line reliability, was the consensus of the opinion of those who discussed the papers dealing with these subjects.

F. G. Baum, consulting electrical engineer of the Pacific Gas & Electric Company, added to his many original contributions to the Institute during the past twenty years an exhaustive treatise on voltage regulation, and insulation of high voltage transmission lines. This paper was one of three constituting a symposium on long-distance transmission systems. Another by W. W. Lewis of the General Electric Company dealt with transmission line tests, and the third by L. L. Eldren of the Edison Electric Illuminating Company of Boston took up the operation of interconnected systems. The discussion of these papers was largely on details of theoretical fundamentals presented, and emphasized the need of constant voltage transmission and flat regulation on long lines, together with accurate information on the operating characteristics of grounded and isolated circuits.

The papers by Messrs. L. E. Imlay of the superpower survey, Raymond Bailey, Philadelphia Electric Company, and by E. H. Fritz of the Pittsburgh High-Voltage Insulator Company and G. I. Gilchrist of the Westinghouse Electric & Manufacturing Company, dealt with transmission from the standpoint of the eastern super-power survey, connections between generating stations and the design and production of suspension insulators.

Water Power Development

The advances in the design of water wheels and water wheel settings were discussed in an able paper presented by W. M. White, of the Allis-Chalmers Manufacturing Company. He pointed out that the present tendency in the development of hydroelectric projects is to develop each site completely and to use the largest units that will permit of the maximum economic use of the power available. Recent advances in design have resulted in increased efficiency and in better regulation, as well as in greater reliability. These are factors that assure the utilization of our water power resources to the best advantage.

The paper dealing with the Niagara Falls development, by J. L. Harper and J. A. Johnson of Niagara Falls, and the portion of the paper by W. M. White dealing with typical water wheel installations such as those at Pit River, Caribou and Niagara Falls, proved to be of great interest to engineers.

Thursday's session was devoted to the discussion of papers presented by F. W. Peek on Voltage and Current Harmonics Caused by Corona; by E. E. F. Creighton of the General Electric Company and F. L. Hunt of the Turners Falls Power Company on A Solution of the Porcelain Insulator Problem; on Transformers for Interconnected High-Voltage Systems or for Feeding Synchronous Condensers from Tertiary Winding, by J. F. Peters and M. E. Skinner, both of the Westinghouse Electric & Manufacturing Company, and the paper by J. B. Whitehead and F. W. Lee, both of Johns Hopkins University. The discussion of these papers was presented from three angles and was conducted under the joint direction of E. B. Meyer and F. G. Baum; first, line insulation; second, engineering and operating problems, and, third, economics.

Electrical Engineering Practice in Italy

On Friday morning Guido Semenza, local honorary secretary of the A. I. E. E. for Italy, and consulting engineer of Milan, gave a most interesting and instructive address on some of the outstanding developments in his country. Among other things he pointed out that there are already in Italy interconnections between the northern and southern groups of hydroelectric power plants, and that this interconnection was brought about without pressure from the government. He is of the opinion that private control of power resources of the country is best. One of the interesting problems is the supplying of power to Sicily; although the island is separated from the mainland by a strait but two and a half miles wide, the swift currents preclude the laying of submarine cables. Serious consideration is being given to the construction of a tunnel in which to run power lines.

Entertainment

H. T. Plumb, engineer of the General Electric Company, as chairman of an able convention committee, showed marked ability in conceiving and executing an entertainment program especially appropriate to the engineering interests of the delegates, as well as acquainting them with the majestic setting of the convention city and its place in the industrial empire of the West. Features of this program were special excursions by automobiles and by train to the substations of the Utah Power & Light Company, over drives in the Wasatch Mountains, and to the mines and milling plants of the Utah Copper Company, which operates the largest surface copper mine in the world. Visiting ladies were elaborately entertained. In addition to several automobile tours there were dancing and musicals in the Utah Hotel and luncheons at prominent clubs. An inspection of the renowned Latter Day Saints Temple and grounds was followed by an impressive organ recital in the tabernacle that was particularly arranged for the convention delegates.

The Salt Lake City convention will long be remembered as one of the most pleasant and profitable of the A. I. E. E. annual conventions, and as a real factor in bringing about a better understanding of the particular problems of the West by those Eastern delegates who were so fortunate as to be in the convention city during the third week in June.

ENGINEERS OF YESTERDAY

(Series Compiled by A. L. Jordan)

24. AMPERE

Why was Ampere called the "father of electromagnetism"?

AMPÈRE [1775-1836]

Andre Marie Ampere displayed mathematical powers at an early age. His father was guillotined during the French Reveolution and the son passed into a long continued state of mental dejection. After his recovery, at the age of 24, he was married, but the early death of his wife added to his previous sorrow. In spite of this he continued his electrical experiments, became a member of the French Institute and was for twenty years connected with the Polytechnic School in Paris.

His work in electromagnetism included the magnetization of steel needles by the electric current, showing the attraction or repulsion of parallel wires carrying current, and a theory of electromagnetism covering the subject from the behavior of a small steel magnet on the one hand to the magnetism of the earth on the other. His experiment where a helix is used as a compass is thus described by Arago: "For several weeks physicists crowded (his) humble study * * * to witness with amazement a conducting wire of platinum take a definite direction through the action of the terrestrial globe. What would Newton, * * * Franklin and Coulomb have said if it had been announced to them that a day would come when, in default of a magnetic needle, navigators would be able to guide their vessels by * * * electrical currents, * * * electrified wires?"

Improved Lighting of the Hotel Lobby a Commercial Asset

Details of the Successful Lighting Installation in the Lobby of the Oregon Hotel of Portland Which Has Solved Illumination Problems Common to All Hotels

BY F. H. MURPHY
Illuminating Engineer, Portland Railway Light & Power Co.

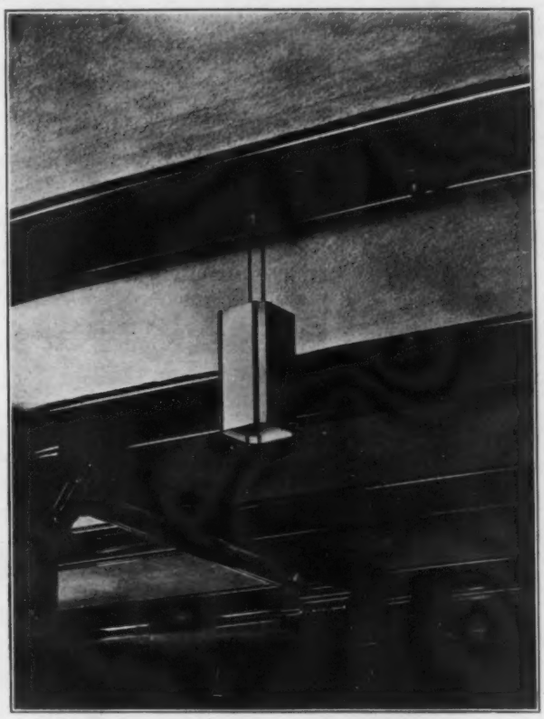
The illumination of a first-class hotel lobby should be restful, cheerful and inviting. It can be and should be made to assist in affording that feeling of hospitality and comfort to the guests that will make them not only want to come again, but also to recommend the place to their friends. It was with this idea in mind that Mr. A. H. Meyers, manager of the Oregon Hotel, recently decided to have the lobby lighting thoroughly revised.

The hotel lobby is 50 feet wide by 90 feet long, with a ceiling height of 14 feet. Rows of supporting columns divide the room into rectangular bays approximately 12 by 18 feet. These columns support two longitudinal beams, while cross beams are placed on 6-foot centers, thus cutting the ceiling into panels approximately 5 by 15 feet. The beams have a depth of about 18 inches, while the upper walls have a plastered surface beneath the beams for a distance of about three feet. Below the plaster a wooden wainscoting extends to the floor, a depth of 9 feet 6 inches. The columns, beams and wainscoting are finished in a very dark glossy color and the upper walls and ceiling panels are finished in dull tans and yellows. In the rear of the room is a large tiled fireplace, above which hangs an oil painting. Along one side of the room are located the offices of the hotel. At the opposite end of the room from the fireplace is the main entrance, with large plate glass windows facing on the principal street. The effect, upon entering, is that of a long room 30 feet wide by 90 feet long and 14 feet high, at the farther end of which is the fireplace.

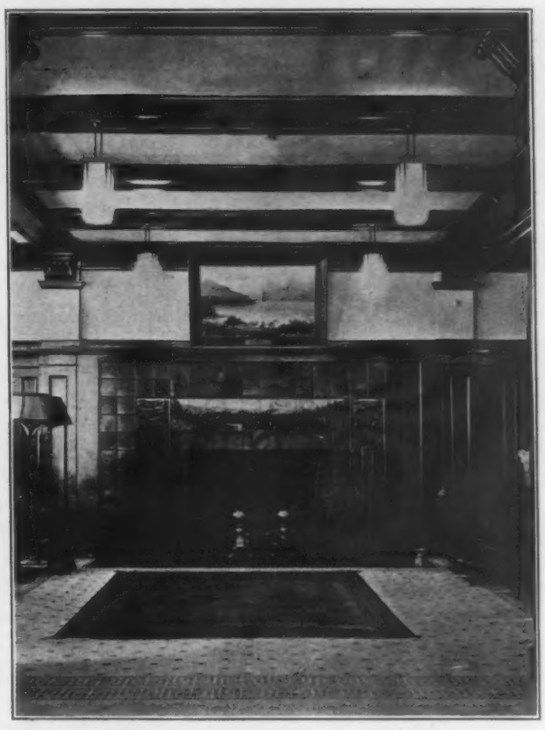
Lighting Possibilities of Lobby

This interior presented great possibilities, if properly illuminated. The lighting equipment then in use was unattractive and irritating because of exposed light sources that were re-directed in narrow beams about the room in such a manner that they did not illuminate the room or its furnishings satisfactorily but produced a glare in the eyes of the occupants.

In properly lighting a room, the principal objects to be obtained were to suffuse the interior with light of an intensity of about four or five foot-candles upon the reading plane, to preserve a view of the interior and to enhance the decorative value which already existed within the room. Such an effect could be produced in this particular room only by a lighting unit which would avoid glare and throw a great quantity of light downward.



Type of unit chosen to improve lighting conditions in the hotel lobby. The lantern is 22 inches high with side panels 5 inches wide, and is both unobtrusive and effective.



Night photograph taken of corner of lobby showing fireplace and painting. These two features of the lobby have doubled in value since the installation of proper lighting.

The center of interest of the room was naturally the handsome fireplace which occupied the center section at the rear. This was very artistically designed and it was desired to emphasize this feature of the lobby particularly, so as to introduce a home-like atmosphere. However, it would be very easy to rob the fireplace of all its charm and effectiveness if ornate or even beautiful fixtures were installed that

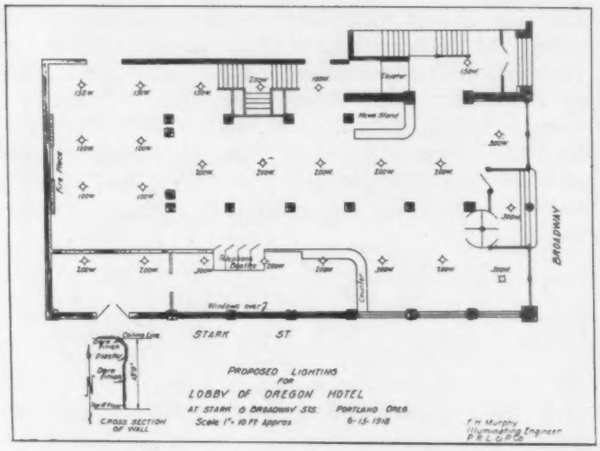


Diagram showing spacing of units in lobby of the Oregon Hotel after rearrangement.

stood out or were conspicuous, either for their beauty or uniqueness, to such an extent that attention would be drawn to the fixtures rather than to the fireplace setting.

Lantern Style for Light Unit

A careful consideration of the size of the room, its color and the architectural style of its members resulted in the development of a lantern as a light holder. This light holder is neither obtrusive nor conspicuous in any way, but is pleasing and in entire harmony with the interior architecture of the room. Very little of the light escapes through the sides, in this way avoiding the injection into the room of an object with too bright a surface, while the very thinly transparent, highly diffusing bottom of the lantern permits the majority of the light to be thrown downward, thus filling the room with light and at the same time concealing the lamp itself. The entire installation as carried out presents an excellent example of an instance in which illumination, rather than an elaborate, over-lighted fixture, is used as the decorative agent.

In the original installation, two branching chandeliers were suspended directly in front of the painting above the fireplace mantel, making it impossible to view this painting satisfactorily by day or by night. The new installation planned to change the ceiling outlets over the area in front of the fireplace, so that the lighting fixtures would in no way interfere with a view of the painting; otherwise, the ceiling outlets were unchanged.

The lantern unit used in this installation is a single light fixture with four sides and mitered corners. The side panels are approximately 5 by 22 inches, and the mitered corners 1 by 22 inches. The sides and mitered corner panels are of dense white opal glass supported in a black iron frame. About one inch from the bottom of the lantern, a bottom plate of very light diffusing glass is placed so as to completely conceal the lamp and filament. The fixture unit is designed of sufficient size to take either a 200 or a 300-watt lamp, the sides being of sufficient area and density to reduce the light intensity to a comfortable value, while the bottom plates are of glass selected with the idea of reducing the absorption to a minimum as well as maintaining a perfect diffusion of the light. The general design is very clearly shown in the accompanying cut of an individual unit. The result is a lighting fixture that is neither obtrusive nor conspicuous in any way, but is pleasing and in entire harmony with the interior architecture of the room.

Effect of the New Lighting

The effect produced upon coming into the lobby is that of entering an attractive, well-lighted place, looking down a long room with a sense of comfort and ease, because of the lack of glaring surfaces, and viewing at the farther end an inviting and home-like scene, the center of which is a large fireplace. The tile front of the fireplace features an embossed panorama of Mt. Hood and vicinity in colors. Above the mantel is a handsome painting of Lake Macdonald, with its wonderful coloring. In front of the fireplace is a large rug, and arranged along either side of the rug leading up to the fireplace are a number of large, comfortable chairs. Near the front, and at one side of the fireplace, is a massive wrought iron floor lamp with a parchment shade. The light escaping from the sides of this shade is only sufficient to brighten it and bring out the colors, while most of the light is thrown downward where it is useful in producing illumination of such an intensity that fine needlework or sewing may be carried on with ease and comfort, if desired, while the general illumination here and throughout the entire lobby is of sufficiently high intensity to give a comfortable light for all general purposes.

The ceiling fixtures in front of the fireplace are so arranged as to provide an unobstructed view of the picture above the mantel, and the whole effect of the lighting is so comfortable and inviting as to draw patronage and make this one of the very attractive features of this hotel. So successfully is glare eliminated from this installation, that it is possible from the other side of the street to look underneath and between the lighting fixtures at night and see distinctly both the fireplace and the painting.

The installation typifies the progressiveness of the management in marshaling the forces of light to assist them in providing for the comfort of their patrons.

An investigation made recently after the installation had become fairly normalized, showed an intensity of 4.5 foot-candles on a reading plane with an energy consumption of one watt per square foot.

Selecting Illumination for the Industrial Plant

A Lighting Expert Discusses Basic Principles of Factory Illumination with Details of a Successful Installation which Improved Operating Conditions in a Wood Working Shop

BY J. J. McLAUGHLIN
Illuminating Engineer, Westinghouse Lamp Company

While the realization of the importance of good illumination for industrial work is growing, there still are some factories inadequately lighted, according to up-to-date lighting practice for such buildings. This is probably due to the fact that artificial lighting is still considered solely as an expense with no returns. This may be true when compared with natural lighting obtained through windows and skylight at the expense only of keeping them cleaned.

Fig. 1.—Night view of the new installation. Note the absence of deep shadows and the pull switch controlling the illumination of each bay, giving a flexibility to the installation.

However, even though nature supplies us with practically free light, yet there are periods when natural lighting fails to provide sufficient illumination to make it possible to continue working in an efficient manner. This condition, by shortening the work-day, calls for some other means to provide the necessary illumination to continue the work. This is only one factor, of many, in favor of good artificial illumination.

Need of Artificial Lighting

Although in the modernly constructed factory building of today the window area comprises a large percentage of the area of the walls, still if the building is from sixty to a hundred feet wide and the ceiling is only from ten to twelve feet high, the daylight intensity falls off very rapidly in the center bays. The only sections receiving good natural light are those near and adjacent to the windows. This applies more to the older types of factory buildings in which the window areas are very much limited and the ceilings are low.

Under these conditions it is necessary to provide the proper artificial lighting in order to make the illumination uniform and of an adequate intensity to permit manufacturing operations to be carried on efficiently. Such a condition as inadequate illumination, both natural and artificial, existed in the center bays of the shop shown in Fig. 1 before the new lighting was installed.

Old Conditions of Shop

First of all the room consisted of 4 bays, each 20 feet wide, and the two center bays did not receive a sufficient amount of daylight to carry on the work in an efficient manner. Deep shadows were formed by the object worked on if the machine happened to be a little nearer to the windows on one side than to the others.

Second, the old installation (consisting of one 200-watt Mazda C lamp, equipped with a bowl-dome reflector in the center of each 20 by 20-ft. bay) did not provide sufficient artificial illumination, due to the fact that the units were spaced too far apart for the height of ceiling and type of reflector, and the 200-watt lamp was too small to illuminate the area of one bay to the proper intensity. The intensity delivered on the working plane was 2 to 3 foot-candles between the units and 5 to 6 foot-candles directly underneath them. Thus the illumination was non-uniform, creating deep shadows, especially when the workman was in a position that brought him directly between the light and the work.

Fig. 2.—Daylight view in wood-working shop after completion of new system of lighting. The new installation consisted of replacing 1—200-watt lamp with 4—150-watt lamps in each bay.

The New Installation

To eliminate these conditions, a new installation was made in which the lighting units were installed on closer spacings which gave a much more uniform illumination over the working plane than was ob-

tained from the old lighting system. The new arrangement consisted of four 150-watt Mazda C lamps, with R.L.M. reflectors in each bay of 20 by 20 feet.

As a result of the change from the old to the new the intensity of illumination was increased approximately four times the average amount delivered

Type of R.L.M. reflector designed for use in large rooms, as in industrial plants especially where there are low ceilings. This reflector was used in the installation shown in Fig. 2.

by the former installation, at an increase of only one-half watt to one and one-half watts per square foot. To make the use of the installation flexible, as far as good lighting practice will permit, each of the four units in each bay is controlled by a ceiling pull switch which can be seen in Fig. 1. By this method of control, the system can be used independently in sections as the occasion may require. For example, in the center bays where the daylight may be low at times, the units in such sections can be used independently of those in the side bays next to the windows where the daylight may be adequate.

Thus by having a lighting system installed in the proper manner the illumination obtained will increase very much more than the watts per square foot, giving results that will show in the quality and quantity of the work produced. The R.L.M. reflector used in the new installation is one of the more recent types of industrial lighting reflectors brought out in the past year or so. This reflector is shown in Fig. 3. It is made of sheet steel surfaced with three coats of enamel; the first is a binding coat and the next two coats are white porcelain enamel for the interior or reflecting surface, and of a dark green porcelain for the exterior. They are used for lighting large factory rooms, etc., especially where the ceilings are low.

While the R.L.M. reflector gives a wide distribution of light, yet the cut-off of light is at such an angle (17 degrees) below the horizontal line through the light center of lamp and reflector, that the bright light source of a Mazda C lamp is shaded from the normal line of vision. Also by the use of the bowl enameled Mazda C lamp the possibility of glare is removed.

It is found that proper lighting reduces accidents, especially with good illumination from an overhead system that lights the entire shop, including aisle ways and spaces where material is placed on the floor. The latter may cause workmen to trip over objects if the shop is not lighted to the proper intensity.

With up-to-date lighting greater accuracy in workmanship is obtainable, thus decreasing spoilage of product, and at the same time the labor cost increasing production.

The accuracy with which an object is seen depends to a large extent upon the amount and direction of light. Thus, if the illumination provided is too low for the work in hand, and comes from the wrong direction, it will be necessary for the workman to expend more effort with his eyes in order to see the work properly. Performing such work under poor light continually for a long period may result seriously to the employer in the low quality and quantity of work; also to the workman himself by affecting his sight, a great loss to anyone.

However, by providing the proper amount of illumination required, the work can be seen better and the workman can work efficiently if the illumination is increased somewhat above the normal intensity required. These actual results have been obtained from the new installation in Fig. 1.

Contented Workmen

Good lighting of workshops results in better working conditions, and reflects on the living conditions of the workmen by the fact that it creates greater contentment. It also makes for better order, cleanliness and neatness in a plant.

THE PLANT MANAGER'S VIEWPOINT ON INDUSTRIAL LIGHTING

An interesting comment on industrial lighting is contained in a recent statement by Mr. R. S. Springer, vice-president of the Holt Manufacturing Company, and manager of the company's Stockton plant:

"The consideration of first cost probably keeps many plant engineers from doing what they know should be done in the matter of proper illumination. The advantages accruing from window glass walls, white painted ceilings and proper distribution of artificial light are generally recognized.

"We previously used the common shop lighting plan of the small incandescent bulb suspended from a cord over each machine. About four years ago, under the direction of competent illuminating engineers, we installed in our machine shop the first unit of our present lighting system. This system has been extended to cover the foundry, forge shop and assembling departments. As a result, we have reduced our labor turnover, because good light means better surroundings, higher morale and contented workmen. We have decreased our spoilage, even though we now require greater accuracy in our work. We know we have materially increased our production, especially on our night shifts, as a direct result of our improved factory lighting.

"We feel that the results and benefits to both the men and to the company have justified the investment and maintenance of our modern lighting equipment."

As a further indication of the importance that Mr. Springer attaches to good factory lighting, the plant's staff includes a special window and lighting unit cleaner, whose duty it is to see that the lighting units are properly maintained and that the windows are washed as frequently as is practical.

There are over twenty-five million electric lamps used in the electric signs of this country; they tell the electrical and industrial story to the great public which throngs the street at night after the day's work is done.

Electricity Modernizes the Signboard

The Electric Sign as an Advertising Medium Comes Into Importance as the Modern Development of One of the Earliest Recognized Merchandising Devices

BY TRACY W. SIMPSON
Federal Electric Company

THOUSANDS of small merchants use the electric sign as their only form of advertising, and each year the electric sign is taking a bigger place in the advertising appropriation of larger ones. There is good reason for this, and the electrical fraternity should be familiar with the theory underlying this useful electrical device.

Since earliest times the extending sign board has been a wonderfully efficient form of advertising. Taverns were designated by a projecting board in the shape of a bush, apothecaries by the mortar and pestle, etc. Since the object was to attract the public, they were often of an elaborate character and of artistic merit and mounted on supports of hand-wrought iron designs. The great artist Holbein designed many of these early signs, and their cost was sometimes as high as $10,000 each in modern money equivalents.

Electric signs illuminate the street

In this day, the extending sign board is even more valuable to a merchant. People have the out-of-door habit more than ever before. Street circulation is large and of a class to which the merchant caters. But the old-fashioned extending sign board cannot be used nowadays on account of the changed custom regarding the rights of property owners to the space above the sidewalk. The modern common law gives this space to the municipality and most municipalities grant what amounts to an easement or franchise on this space to the property owner, provided he will erect only such a sign as conforms to city ordinances. The consideration or payment to the city for this easement consists in the street illumination provided by the sign. This explains why modern cities refuse permission for unilluminated sign boards of olden-day style, yet will grant permission for an electric sign.

The nature of the electric sign is therefore identical with the extending sign board of years ago, but modernized to conform to the modern common law by electrical illumination. From the standpoint of the merchant, this is a happy circumstance as the electric lettering reaches night circulation as well as day, becoming doubly valuable. From the standpoint of the electrical fraternity it is likewise fortunate, since there are upwards of twenty-five million lamp sockets in the country's electric signs, with correspondingly great benefit to all branches of the electrical industry.

A modernized sign board

Study Course

For the Contractor-Dealer, and the Business Man in the Small Industrial Plant

University Accounting Course — IX

Double-Entry Theory — Summary of Operations Accounts

BY PAUL B. KELLY

The manner in which numerous income and expense accounts are evolved from the net worth element in the accounting equation was explained and illustrated in the last lesson. This lesson deals exclusively with the practical application of that theory to the operation of the Standard Accounting System. We now begin a study of the income and expense accounts actually used. If Lesson 8 was thoroughly mastered, this lesson will be easy to understand. It will be necessary, however, to re-read this lesson often enough to remember every detail, because a ready knowledge of the nature of each account used is essential in order to make the proper entries to the right accounts quickly and accurately.

All the income and expense accounts are, of course, exhibited in the summary of operations statement. Carefully read through this statement in order to get a comprehensive view of the whole system of net worth accounts before we begin a study of the purpose and use of each account there shown.

SUMMARY OF OPERATIONS
of the
ACME ELECTRIC CO.
For year 1919.

OUTGO		INCOME	
Cash Discount Allowed	56.60	Sales Billed	79,317.43
Cost of Sales Billed	62,225.36	Cash Discount Earned	968.93
Fr't, Exp. & Carting	7.90		
(Overhead)			
GENERAL EXPENSES			
Salaries	7,280.00		
Rent	480.00		
Light, Heat, & Power	104.79		
Stationery, & Off. Supplies	68.65		
Telegraph & Telephone	118.94		
Postage	46.30		
Advertising	642.92		
Taxes	193.67		
Insurance	224.40		
Association Expenses	326.00		
Automobile Expense	544.32		
Other General Expenses	243.19		
CONTINGENCY RESERVES & DEPR'N			
Allowance-Loss on accts Rec.	100.00		
Allowance-Dep. on Fur. & Apf	72.00		
Allowance-Dep. on Autos	480.00		
Allowance-Dep. on Tools	60.00		
Allowance-Dep. on misc	300.00		
PROPRIETORSHIP ACCOUNTS			
Dividends Distributed 5000			
Balance to Surplus 1800	6 800 00		
Total Profit in 1919	6,800.00		
TOTAL	80,285.03	TOTAL	80,285.03

Income Accounts

The Standard Accounting System provides three accounts for classifying income from different sources. Two of these accounts are exhibited in the statement shown. The Acme Electric Co. had no occasion to use the third. Income accounts should normally show a credit balance.

INCOME ACCOUNTS

1. Sales Billed Cr.
2. Cash Discount Earned Cr.
3. Commissions Received Cr.

Sales Billed Account

This account is credited with all sales of merchandise and labor. The data for making the credits to this account are obtained from the cash sales tags and the customer's bills. This account is debited when sales are returned and when customers are allowed rebates or other deductions from the billed amount. The balance of this account represents the net amount of sales for the period.

In describing the use of the accounts in this lesson, only the side of the double entry that affects the account being discussed will be given. Any debit or credit to one account must result in a credit or a debit to another. For the sake of brevity only one side of the entry that would be made is mentioned. It will greatly aid in learning this material if you make up a schedule of all the complete entries that you can think of that affect the account under discussion. For example, a schedule of entries for the sales billed account is like this:—

DEBIT	CREDIT	DEBIT	CREDIT
Sales Billed	Accts Rec.	Accts Rec.	Sales Billed
" "	Cash	Cash	" "

Cash Discount Earned

Many business houses from whom the contractor-dealer purchases merchandise or services allow him to deduct a certain percentage from the amount of their bills in consideration of a prompt cash settlement. The amount deducted from bills in this way is called Cash Discount Earned. It is regarded as income to the buyer and not as a deduction from the cost of his goods. It is an inducement to the buyer to part with his cash before the bill is due. It is considered to be interest which the seller pays the buyer in order to secure the use of the money involved before he has the right to demand it.

The amount of cash discount earned is credited to this account. As an illustration let us assume that you purchased $100 worth of merchandise from the P. S. E. Co. You received an invoice for $100 on which it was stated that if you paid the bill by Jan. 10th you would be allowed to deduct 2% from the bill. You take advantage of the offer by sending a check on Jan. 9th for $98. The payment of the bill is recorded by this entry:

Dr. Liabilities	$100	Cr. Cash	$98
		Cr. Cash Discount Earned	$ 2

Before this entry is made the accounts affected are like this:

LIABILITIES		CASH		CASH DISCOUNT EARNED
	100	Bal 500		

After the entry is made the accounts are like this:

LIABILITIES		CASH		CASH DISCOUNT EARNED
Bal 100	100	Bal 500	98	2

Commissions Received

This account is credited with the amount of commissions received from manufacturers and jobbers as compensation for negotiating sales which are billed by the manufacturer or jobber directly to the customer. This account is one which many contractor dealers will have no occasion to use.

Expense Accounts

The expense accounts far outnumber the income accounts. The reason for this is that income comes into the business through only a few channels; while on the other hand, many different classes of expense provide the outgo. It is necessary to have numerous expense accounts in order to get the detailed classified information needed to discover and stop leaks.

Cost of Sales Billed Account —

This is a very important and much used account. Its function is probably fairly well understood already because it was used in the last lesson.

This account is debited with the cost of all merchandise sold. Whenever an entry is made recording a sale, a parallel entry is made to debit the Cost of Sales Billed Account and to credit the Merchandise Account with the cost price of the merchandise relinquished. If this point is not clear to you, it indicates that you should review Lesson 8. The cost data necessary to make this entry is recorded, as you will recall from lessons 2 and 3, on the cash sales tags and the customers' bills.

To this account is also debited the cost of the merchandise, labor, and direct job expenses expended on construction jobs that have been billed. The necessary data is gathered on the job envelope and is recorded on the customer's bill.

It is essential that you understand how this account operates, for much of the accounting work centers around it. Study this illustration well.

Assume that you have just completed a time and material job and have billed the customer for $150. The duplicate of the customer's bill shows that the total cost of the job is $100, of which $60 is merchandise cost, $28 labor cost, and $2 direct job expense. Two distinct double-entries are necessary to record this data in the accounts.

DEBIT		CREDIT	
1. Accts Rec.	$150	1. Sales Billed	$150
2. Cost of Sales	$100	2. Merchandise Acct	$ 60
		Labor Unbilled Acct	$ 38
		Direct Job Expense Unbilled	$ 2

Assume that before the entry the accounts affected were—

Accts Rec		Sales		Cost of Sales		Mdse		Lab Unbilled		D/E Unbilled	
500			800	425			1000	100		20	

After the entry the accounts would reflect the change like this:

Accts Rec		Sales		Cost of Sales		Mdse		Lab Unbilled		D/E Unbilled	
500			800	425			1000	100		20	
150			150	100			60		38		2

Cash Discount Allowed Account —

This account is the opposite of the income account called cash discount earned. To this account are debited all discounts which customers are allowed to deduct from their bills as an inducement to them to pay them promptly. Assume, for purposes of illustration, that you send to one of your customers a bill for $100 subject to a discount of 2% for cash in 30 days. If your customer pays the bill within 30 days he may settle in full by tendering you a check for $98. The payment of the bill would be reflected in the accounts by the following entry:

CREDIT		DEBIT	
Accts Receivable	$100	Cash	$98
		Cash Discount Allowed	$ 2

Commissions Allowed Account —

This expense account is just the opposite of the income account called Commissions Received. Commissions paid to agents or others for securing orders are debited to this account. Many contractor-dealers will not have occasion to use this account.

Freight, Express, and Carting (Unabsorbed) —

Entries to this account will not occur frequently. Charges for freight, express, or carting on material coming into the store are a part of the cost of such merchandise, and should be debited to the merchandise account. Carting charges for transporting the material from the store to the job where it is used should be debited to the direct job expense account. This account should be debited only with other miscellaneous freight, express, and carting charges which are not absorbed by the merchandise or the direct job expense accounts.

Salaries Account —

To this account is debited all payments for salaries or wages of employes who are not **directly** productive. Debit this account with the salaries of such people as superintendents, salesmen, stock-room boys, bookkeepers, stenographers, etc.

Miscellaneous Self-Explanatory Accounts —

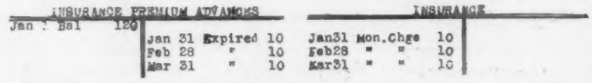
All of the following accounts are self-explanatory because of their titles. These accounts require no explanation because common sense will be sufficient guide in making entries to them.

1. Rent
2. Light, Heat, and Power
3. Stationery and Office Supplies
4. Traveling and Entertaining
5. Telegraph and Telephone
6. Postage
7. Advertising
8. Association Expenses
9. Automobile Expenses.

Taxes and Insurance —

In Lesson 7, it was explained that when insurance is purchased a deferred asset account known as Insurance Premium Advances is debited. Likewise, when taxes are paid in advance, an account called Taxes Paid in Advance is debited. It was pointed

out that the passage of time consumes the value of these deferred assets. Periodically an entry must be made in the accounts recognizing this fact. In practice, this is done at the end of each month by a credit entry which reduces the asset values in these accounts with the portion of their values that has been consumed by the elapse of the month then ending. The corresponding debit is made either to the insurance account or to the taxes account. These are expense accounts and their balances represent the portions of such charges which apply to the current period. The expense is thus prorated to each month and an accurate summary of operations is obtained. Here is an example of how these accounts are operated.



Warehouse Upkeep Account —

Debit this account with all payments for packing materials such as excelsior, twine, wrapping paper and cartons used in packing or boxing. It is also debited with the cost of repairing and renewing short-lived and inexpensive tools used in the warehouse and stock-room.

Interest Account —

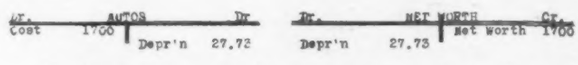
Debit this account with all amounts paid by the contractor-dealer for the use of money.

Other General Expenses Account —

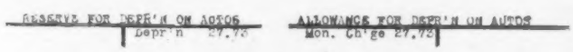
This account is debited with all incidental and miscellaneous expenses not provided for by the other expense accounts described. Such charges as contributions, donations, fees for builder's reports, and registration fees are debited to this account. Care should be exercised that every charge about which there is a little doubt, is not dumped into this account.

Contingency Reserves and Depreciations —

These accounts are expense accounts and like all other expense accounts they represent decreases in net worth. The decreases in net worth which are recorded by these accounts are due to the decline in the value of certain assets. In Lesson 7, it was explained that some of the assets, such as automobiles, decline in value with the passage of time and with use. It was pointed out that depreciation might be recorded in the asset and the net worth account in this manner:



Instead, however, the entry is made to the following accounts. The same effect on the accounting equation results, but the second method gives additional information.



The reserve for depreciation on autos is shown in the balance sheet on the right side and is intended to represent a deduction from value of the autos shown on the other side at cost.

The allowance for depreciation on autos is an expense account. Like other expense accounts, it is closed into the P & L Account at the end of the year.

Allowance for Depreciation on Furniture and Office Appliances —

The value of all furniture and office appliances should be written off the books in a similar way during a period of not more than ten years. Each month 1/12 of the estimated annual depreciation on these assets should be debited to allowance for depreciation on furniture and office appliances and credited to reserve for depreciation on furniture and office appliances.

Allowance for Depreciation on Tools —

The value of tools and the value of autos are depreciated at the same rate and in exactly the same way. At least one-third of the value of tools should be written off each year. This means that each month an entry of this sort will be made:

DEBIT	CREDIT
1/36 of the cost value of tools to Allowance for Deprec'n on Tools	1/36 of the cost value of tools to Reserve for Deprec'n on Tools

Allowance for Depreciation on Merchandise —

In any concern, a certain amount of the merchandise stock is bound to become obsolete and worthless. The contractor-dealer, like every other business man, strives to prevent this, but nevertheless it occurs. Once in a while, the contractor-dealer goes through his stock and picks out the obsolete items which he feels he will never be able to sell, and which are occupying space that is in demand. He throws these items away, or, at best, sells them as junk. A proportionate part of the annual loss due to obsolete stock should be charged to each period. Each month, therefore, an entry is made debiting 1/12 of the estimated annual loss due to this cause to Allowance for Depreciation on Merchandise, and crediting the same amount to Reserve for Depreciation on Merchandise.

When the obsolete items are discarded, an entry should then be made debiting Reserve for Depreciation on Merchandise and crediting the Merchandise Account.

Allowance for Loss on Notes and Accounts Receivable —

The same principle that is involved in the previous account is involved in this one. No matter how careful the contractor-dealer tries to be in extending credit, he is sure to suffer a certain amount of loss due to the fact that some of his customers fail to pay their bills. At rather long intervals, he thumbs through the Accounts Receivable Ledger and eliminates a number of the accounts which he considers as worthless, and for which it is useless to send out further bills. This procedure would result in a sudden drop in the Accounts Receivable Account, and an unusual debit to the Net Worth Account in the minth in which it happened to take place. The monthly Summary of Operations would not accurately reflect the trend of the business.

The proper procedure is as follows. This is important. Get it.

The contractor-dealer, on the basis of past experience, should estimate his annual loss due to this cause. He should then debit 1/12 of this loss each month to Allowance for Loss on Notes and Accounts Receivable, and credit it to Reserve for Doubtful Notes and Accounts Receivable.

When the dealer definitely decides that an account is worthless, he may write it off by crediting the amount involved to the Accounts Receivable Account and by debiting it to the Reserve for Doubtful Notes and Accounts Receivable. This procedure is designed to spread the loss from this source evenly to each month.

Summary

In an earlier lesson it was said that when you could state the proper debit and credit for any transaction, you could consider yourself an accountant. In order to be able to make the proper debit and credit you must know every detail of this lesson. Read it and re-read it.

You cannot consider that you know this lesson until you can tell from memory what transactions result in debits and what transactions result in credits to each account exhibited in the Summary of Operations.

Using the Store as a Business Builder

How to Attract Customers through the Carefully Planned Arrangement of Window and Store is Demonstrated by the Lantz Electric Company of Long Beach, California

Most sales begin in the window, and in their new store in Long Beach, California, the Lantz Electric Company have made skilful provision for this fact. Movement and light, two of the surest means of attracting the attention of the human eye, are freely used. Each of the show windows is lighted by twenty-six 100-watt mazdas, mounted in reflectors of a special original design. A flasher permits these to be manipulated in such a way that any desired color, or combination of colors can be obtained. A continuous change of colors is found to be a most effective method of attracting the attention of the passer-by.

Another form of movement used is the window demonstration. The left show window is built on a level with the floor to accommodate the larger labor-saving devices, and can be used as a model laundry. Everyone stops to watch these washing machine demonstrations—from the housewife who wants to see if the clothes come out clean and with a full quota of buttons, to the small boy who has a vague ecstatic hope that the lady demonstrator may fall into the soapsuds.

The show window on the opposite side is raised, and is devoted to the display of the smaller appliances. Careful color schemes, tasteful arrangement, and artistic lighting made this window fully as attractive as the other. As the store is situated in the business center of the town, it reaps the fullest advantage from its special window displays.

Lighting is a feature of the interior, as well as of the windows. The wall cases for the heating appliances are lighted with subdued colored lamps, giving an exceedingly pleasing effect. In the center of the store is a home-like arrangement of chairs, rugs, and tea wagon, which is irresistible to the woman customer.

The laundry equipment and the vacuum cleaners, contrary to the usual custom, are placed at the front of the store, where they immediately attract the attention of the housewife. It has been found that the average woman is more interested in the

The lamp rack is built into the wall case, and each lamp is operated by an individual switch.

The laundry display is placed at the front of the store, and one of the windows at floor level accommodates washing machine demonstrations.

Special coloring and lighting make this store interior singularly attractive to women shoppers, while the radio department in the rear is an unfailing magnet for the small boys of the community.

large labor-saving devices than in any of the smaller appliances; the stationary tubs with continuous hot and cold water, and the washing machines, set against a white wall, seldom fail to attract her.

The whole store is planned most carefully to appeal to women. The harmonious coloring, the artistic placing of the fixtures, the attractive furniture, and the home-like glow from numerous table lamps—all these combine to take away the cold commercial atmosphere which tends to repel the woman customer in the average electrical store. The small boy, however, is not forgotten. He can pass through the "mess of furniture" to a real scientific sanctum in the rear—the wireless department. Here he can practice sending and receiving to his heart's content, undisturbed by the incomprehensible females who come in looking for such useless fripperies as silk lamp shades and curling irons.

Another feature of the store planning is the lamp rack, which is not placed on the counter in the usual way, but built into the wall case, with individual switches operating each lamp. The great majority of customers are familiar with the type of lamp they desire, and consequently it was thought unnecessary to crowd the counter with the lamp rack.

The offices are on the mezzanine floor, and seats are provided near the cashier's window for the convenience of jobbers' salesmen and customers paying bills.

Everything is done to make electrical shopping easy and pleasant for the customer. The canny manager has found that the average person who comes in for some small wiring device gesticulates with one finger and asks for "one of those little round things—you know—a thing that screws on, with a bump in it—about this size—made of brass or tin or something," and he has therefore provided a notion case displaying one hundred different articles. The customer can walk up to this comforting device, point a triumphant forefinger at the required article, and say confidently, "I want two of these, please." Thus the store force is saved considerable time, and the customer occasional embarrassment. And efficient selling and pleased customers are the ne plus ultra of merchandising.

INVESTMENT IN ELECTRICAL COMPANIES IN THE WEST

The present investment in the electrical industry of the West at the present time amounts to just about one-eleventh of the total assessed valuation of property in this region as given in government reports. An idea of the growing importance which electricity has shown during the past twenty years is to be obtained by comparing similar figures for 1902. At that time the investment in electrical companies amounted to something less than one-fortieth of the total assessed value of property. This rapid growth is due to the increasing per capita use of electricity which has brought the electrical industry up to an even more important place in community activities.

Handling Practical Problems in the Operation of Motors

The Twenty-Second Paper of a Study Course Designed to Meet the Needs of the Contractor-Dealer and the Electrical Man in the Small Industrial Plant

BY H. H. BLISS

Generators and Motors.—In a great power system, such as one of those which cover the western states with networks of high tension lines, there are many generating plants operating their alternators in parallel. Whenever the supply of water or steam is cut off from one of the "prime movers" driving a generator, that machine ceases to carry its share of the load on the system. The alternator, however, keeps running as fast as before, and is said to be "motoring on the line" since it takes power from the wires instead of supplying it.

To understand this action, one may refer to the difficulty found in driving a generator which carries a load. The armature coils become electromagnets which are attracted to the poles of the field immediately after they pass them, and the periodic reversal of the armature current changes the polarity of the coils exactly at the right time to maintain this action. Now, if the line current enters the armature where it previously left it, all the armature poles are changed and hence repel the field poles which have just passed them. This action serves to keep the machine going.

Fig. A illustrates how one of the d.c. "exciters" is driven in a California power house. This generator, **G**, is on the same shaft as a small water wheel, **W**, and an alternating current motor, **M**. The wheel normally drives the combination at such speed that the motor acts as an a.c. generator and delivers a small amount of current to the bus bars. Occasionally the water is accidentally stopped, and then the a.c. machine picks up the load instantly and drives the generator, so that the supply of exciting current is not interrupted. The d.c. machine could also function as a motor and would continue to run the set in the same direction if the a.c. line were opened, providing the other exciters in the station were left connected to this one.

The reversibility of dynamo machines is further illustrated by the "dynamic braking" employed on electric railways. When the trains coast down mountain grades the motors are left connected to the trolley wire, and as generators they supply energy to the line. In other installations emergency stops are made by short-circuiting the motors, which instantly act as generators and produce heavy currents which retard their motion very greatly.

Back E.M.F.—If a small d.c. motor is connected as shown in Fig. B, with the switch blade on the lower contact point, the battery will drive the motor with a current which the ammeter shows to be large at first but which drops to a lower value as the machine gains speed. The amperes increase again if one presses something against the pulley to retard the motor. Opening switch S gives a clue to the explanation of this action, for the voltmeter continues to indicate an e.m.f. until the motor stops. If the experiment is repeated and the switch quickly thrown to the upper contact, the ammeter shows a current flowing backward through it. We conclude that the motor generates an electromotive force opposing the battery, and that this "counter voltage" or "back e.m.f." is proportional to the speed of the machine. At high speeds the applied voltage is so little in excess of this that it can force only a small current through the resistance of the armature. The variable resistance, **R**, is used during the starting period to restrain the current until the back e.m.f. becomes high enough to protect the motor.

We may define the "net voltage" as applied volts — counter volts. Then the armature current = net volts ÷ resistance, which leads to: net volts = armature current × resistance.

A small series motor, connected as in Fig. B, took 5 amperes at 2 volts when the armature was held still, 1.8 amperes at 3.3 volts when running free, and 2.5 amperes at 3.0 volts when loaded by pressing

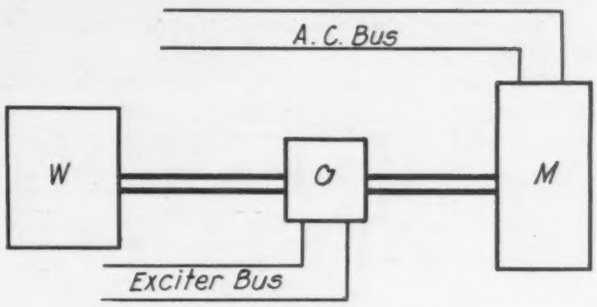


FIG. 'A'

Fig. A—Exciter driven by water wheel with induction motor stand-by; normally the latter machine acts as an induction generator.

against the pulley. Find counter voltage in each case, watts input to motor and watts copper loss in each case. The first test shows that the resistance of the motor = 2/5 = .4 ohm; net volts running free = 1.8 × .4 = .7, and therefore counter voltage = 3.3 — .7 = **2.6 volts.** When loaded the net volts = 2.5 × .4 = 1.0; back e.m.f. = 3 — 1 = **2 volts.** Input to motor is **10 watts** in the first case, **5.9** in the second, **7.5** in the third. Copper loss = amperes² × ohms = **10 watts** in the first case, **1.3** in the second, **2.5** in the third.

Starting Box Resistance.—When a d.c. motor is started with the help of a resistance in series with the armature, the current is at first limited chiefly by

the ohms in the starting box. For an armature of .025 ohm resistance in a 30-hp. motor of 90% efficiency, what resistance must be used to limit the starting current from a 125-volt line to twice the full load current? (Take the drop at the brushes as 4 volts during the starting period.) Solution: 30 hp. = 22.5 kw.; 22.5/.90 = 25 kw. input; 25,000/125 = 200 amperes = full load current. Hence the starting current must not exceed 400 amperes. With 4 volts drop at commutator we need 121/400 = .302 ohm in armature and starting box, or .302 — .025 = **.277 ohm in box.** This solution neglects the slight

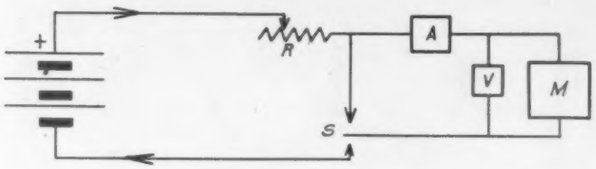


FIG. 'B'

Fig. B—Diagram of connections for showing back e.m.f. of motor.

complication of the field current, which would be only about 3 amperes.

Rule for Direction.—In any motor there is a definite relation between the way the current flows through an armature wire, the polarity of the nearest pole of the field, and the direction in which the rotating part (armature or field) revolves. This relation is readily understood by recalling the "generator rule": **Select a standpoint from which the machine is seen to rotate clockwise; then in a wire near a N pole the induced voltage is directed away from the observer.**

To apply the rule to a motor, remember that here the e.m.f. induced is a counter voltage, opposing the current. Hence the current comes toward the

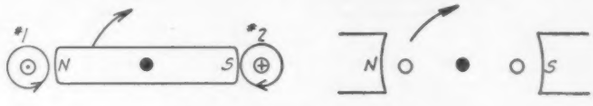


FIG. 'C'

Fig. C—Illustrating motor rule: "If machine turns clockwise, current flows toward you near a N pole, from you near a S pole."

observer in wires near a N pole and flows away from him near a S pole (it being understood that one is looking from the right end of the shaft to make the rotation clockwise).

The rule is readily verified by reference to Fig. C which shows the conditions in both d.c. and a.c. motors. In the alternating machine (at the left) the current in inductor No. 1, coming toward the observer, sets up lines of force running counterclockwise about itself (Ampere's right hand rule). These force the adjacent N pole upward, tending to rotate the field structure clockwise. Current in wire No. 2, directed away, produces flux as shown, which would force the pole near it upward if it were a N pole; since it is a S pole it goes the opposite way, assisting in the clockwise rotation.

Answers to Previous Problems

235. It must be for **constant voltage regulation** as the resistance is too high for the coil to be in series with the load. Current through it = .25 ampere; .25 × 240 = **60 ampere-turns.**

236. Resistance = .09 ohm; drop = 6.3; 78 + 6.3 = **84.3 volts.**

237. First assume no drop; 10,000/78 = 128 amperes; then drop = 128 × .09 = 11.5 volts, and terminal voltage = 78 — 11.5 = 66.5. Second assumption of 66.5 volts: 10,000/66.5 = 150 amperes; drop = 13.5 and terminal volts = 64.5. Third trial: 10,000/64.5 = 155 amperes; drop = 14 and terminal volts = 78 — 14 = **64 volts.** Take this as final, since additional trials would change it very little.

238. Temperature is 25° above standard; 25 × .00032 = .008; 1.275 + .008 = 1.283, indicating slightly better than **full charge.**

239. 1.280 — 1.265 = .015; .015/.00032 = 47; 70 — 47 = **23° Fahr.** Though this is well below the freezing point of water (32° Fahr.) the electrolyte would not freeze on account of the large amount of acid present.

240. There are three parallel sets of 14 cells each in series. Ohms of battery = (30.8 — 29.9)/60 = .015; each set of 14 cells has 3 × .015 = .045, and one cell has .045/14 = **.0032 ohm.**

241. Battery resistance = .006; external resistance = .330 — .006 = .324; 20 × .324 = **6.48 volts at terminals.**

242. Voltage at first = 6.6 + 20 × .22 = 11 volts; afterward 6.6 + 14 × .22 = 9.7 volts; difference = 1.3 volts which is 1.3/11 or 12% of the original voltage; as the speed did not change the flux must have **decreased by 12%.**

243. Drop is 12 × .28 = 3.36 volts; 10.36 — 3.36 = 7 volts applied to shunt field; 7/10 = **.7 ampere** and .7 × 1000 = 700 ampere-turns in shunt field; **12 amperes in series field** make 360 ampere-turns; 700 — 360 = **340 net ampere-turns.**

244. Volts at slow speed = 6.5 + 10 × .3 = 9.5; at higher speed, 6.5 + 17 × .3 = 11.6; rise = **2.1 volts.**

245. Had the flux been constant the voltage would have risen to 36/8 of 9.5 = 42.7 volts; 11.6/42.7 = 27% of this voltage which was retained, which indicates that only 27% of the former flux was present, or **73% of flux destroyed.**

Motor Problems

246. An armature of .08 ohm generates 104 volts opposing an applied voltage of 110. What current flows?

247. An applied voltage of 550 sends 40 amperes through a .2 ohm armature. Find the counter e.m.f.

248. A current of 12 amperes is taken by an armature generating 170 volts back e.m.f. when connected to a 230-volt line. Find the resistance in the armature circuit.

249. When generating a counter e.m.f. of 107 volts an armature of .05 ohm resistance takes a current of 80 amperes. What voltage is applied to it?

250. An armature of .09 ohm takes 200 amperes when its counter voltage is 102. Find the brush voltage if the commutator contact drop is 3 volts.

251. A 10-hp. motor with .1 ohm in the armature and 2 volts drop at the brushes is to be run on 113-volt current. What resistance is needed in the starting box to limit the initial current to 180 amperes?

252. For the same current, what external resistance is in the armature circuit when the counter voltage has risen to 82 volts?

253. Find the ohms in the first step of the starting box for a motor, with armature and brush resistance = .3 ohm, which must not take over 40 amperes on a 230-volt circuit.

254. Explain from Fig. C how the "motor rule" is true for d.c. machines.

255. A motor with .09 ohm in the armature takes 15 amperes on a 240-volt circuit while generating a counter voltage of 195. Find combined resistance in brush contacts and starting box.

256. From the following test data determine the average resistance of a motor field. Which readings were taken at the highest temperatures?

Amperes	.80	.827	.453	.73
Volts	17	18.2	10.9	15

257. Find average armature and brush contact resistance and brush contact drop for the same machine from the following:

Amperes	3.08	4.90	8.00	13.4
Armature volts	.55	.80	1.30	2.0
Brush volts	1.73	2.61	3.05	3.5

Builders of the West

ONCE upon a time, which is the way that all good stories should start, the goddess Electra acted as godmother to a little lad who was born in Louisville, Kentucky. At the time nobody realized it, but she definitely shaped his life so that when the time came he should take a leading part in the great cooperative idea which her devotees on the western seaboard were later to concoct. William S. Berry was the little tike taken under the wing of the goddess and for the next six years she allowed him to roam over the Atlantic seaboard and Mississippi valley from Louisville to New York, from Nashville to Winchester, finally letting him settle down in the town of Quincy, Ill. Here "Bill" received his schooling in the grade schools and finally at Chaddock College where he took a pre-legal course, as his father was a man of the law and wanted sonny to follow in his footsteps. The lady before mentioned, had something to say, however, and young William had a leaning toward the commercial life. So father was elected president of the newly formed Quincy Electric Light Company and the first summer out of college William S. Berry helped to install the machinery. There it was that Electra wove her web around him and he became so enamored of the little lady with the electric blue eyes that to this day he has remained always constant in her service.

WILLIAM S. BERRY

San Francisco Sales Manager, Western Electric Company

who has been one of the moving spirits in putting the entire electrical industry behind the financial programs of western power companies.

When William S. (nobody seems to know what the S. stands for) Berry finished with the installation at Quincy he went to Lynn, Mass., to take the expert student course that was being given by the Thompson-Houston Company, which later consolidated with the Edison Electric Company to become the General Electric Company. After completing his course he was transferred to the Western district, which embraced all of the territory from the Mississippi River to the Pacific Coast. With his headquarters in Chicago he traveled out into the wilds of Montana and up and down the middle West, or the far West as it was then known, installing electric light plants, blazing the trail for those larger power companies which have since sprung up as that section of the country developed.

After the World's Fair in Chicago in 1893 business slackened and William S. (Berry, not Hart) left the far West for the more effete East where he took a position with the Consolidated Traction Company of Pittsburgh. Here as superintendent of the electrical department he had charge of the rebuilding of the system, of outside construction and of the power stations. Those were the days when a generator ran on a promise, and the promise was liable to be broken from very remote causes, such as the speaking of a harsh word by the motorman to his motors. For ten years "Bill" was on the job twenty-four hours a day, but in 1903 he was offered a chance to go to Russia to put in the street railways in Moscow and St. Petersburg. Leaving the Consolidated on a retaining fee he spent the winter in New York, but in the spring the contract failed to materialize and he was out looking for a job. Several good offers were made him to enter some other field, but he remained true to his first love, Electra, and tied up with the Western Electric Company in New York in 1904. He wanted to work in New York, for he was tired of the other places, and all went well until 1907, when he was ordered to Cincinnati. Being a good soldier he went, but to his relief the following year he was sent to San Francisco as sales manager of the San Francisco district.

In 1919 Grover Anderson, sales manager of the Electric Appliance Company, conceived the idea that the jobbers should become financially interested in the power companies in whose districts they did business. This idea was advanced by Anderson, and the same year at the Pacific Coast jobbers' convention C. C. Hillis, vice-president and treasurer of the Electric Appliance Company, put the idea before the association. It was applauded, and at the next convention steps were taken by the association to put a working plan into action. To William S. Berry, Electra suggested the idea that this was too big a thing to be indulged in only by the jobbers, and at an early meeting of the San Francisco Electrical Development League he proposed that the League start a drive to see that every member of the electrical industry became a stockholder of the local power company. For upon the success of the power company depended the success of the entire industry. Under his able leadership the drive was started, and the results were satisfactory in the extreme. Since that time the idea has been tried out in many other communities and has proved one of the most effective methods of inter-industry cooperation. The confidence thus shown by electrical men in their own works makes a powerful impression upon local opinion and helps to establish an attitude of good will towards all electrical interests.

There is an old saying that as the twig is bent so will the tree grow, and the first six years of Bill's life, spent in wandering over the grassy slopes of the Mississippi valley, have left their mark on him. Even to this day he likes to wander over the grassy slopes in search of the little white ball that resembles one of the forms of fungi familiar to all as the puff ball, and the verdant tops of the tables are not unaware of his ability to make balls chase one another. It is not hard to find the reason why Bill Berry is held as one of the most prominent men in the electrical industry on the Pacific Coast, for his personality and keen business judgment make him sought for in all important conferences. To William S. Berry, therefore, god-son of Electra, this issue of Journal of Electricity and Western Industry is affectionately dedicated in recognition of the work he has done in establishing in the mind of the public the fact that the electrical industry has confidence in itself, and is supporting the power companies financially as well as morally. And may he live in the West happily ever after, which is the way that all good stories should end.

PERSONALS

Edwin O. Edgerton, former president of the California State Railroad Commission, has been elected president of the East Bay Water Company, operating in the cities of Oakland, Berkeley and Alameda, California. He succeeds **Wigginton E. Creed,** who resigned in order to devote more attention to the affairs of the Pacific Gas & Electric Company, of which he is president. Mr. Edgerton is one of the outstanding figures of the country in the formulation of the policy of regulatory commissions controlling the public utilities, and it is largely through his work as president of the California State Railroad Commission that the public service companies in California are considered so favorably among the utility companies of the country, as it is only through a broad-gauged policy that the utilities can render adequate service to the public and at the same time remain financially strong. The East Bay communities are particularly fortunate in having at the head of one of their most important public service companies a man of Mr. Edgerton's proven ability and breadth of vision.

Leonard Waldo, electrical and metallurgical engineer of New York City, is in San Francisco on a business visit.

Don C. Ray has been made assistant manager of the commercial department of the Pacific Gas & Electric Company.

W. D. Moriarty has been appointed field representative for the state of Washington for the Northwest Electrical Service League.

L. A. Herdi, of Ogden, Utah, has been instrumental in the establishment of an "electrical home" which was opened at Ogden recently.

Adolph Strauch, range expert with the Pacific Gas & Electric Company, is conducting experiments for prevention of frost by electrical methods.

Charles H. Claytor has been appointed manager of the new business department of the Sacramento division of the Pacific Gas & Electric Company.

George R. Rienks, formerly with the Amalgamated Sugar Company of Ogden, Utah, has accepted a position with the Great Western Sugar Company of Denver, Colo.

W. E. Dunn, vice-president of the Los Angeles Railway Corp., has returned from a business trip to New York and is staying in San Francisco prior to returning to Los Angeles.

A. L. Black, valuation engineer for Ford, Bacon & Davis in the San Francisco office, has undergone a serious operation and is now recovering at one of the San Francisco hospitals.

A. J. Frey, formerly with the Los Angeles Steamship Company, has been appointed as one of the three directors of operation of the emergency fleet corporation of the United States Shipping Board.

Sidney W. Bishop, of Denver, has been appointed executive manager of the recently created Electrical Cooperative League of Denver, Colorado, and has opened an office in the Gas and Electric Building.

E. O. Shreve, San Francisco manager of the General Electric Company, will return from a six weeks' visit to the Hawaiian Islands the latter part of the month. He has been combining business with pleasure.

D. M. Swobe, who is well known in western railroad circles and at present executive head of the western division of the American Short Line Railroad Association, has been elected president of the McCloud River Railway.

Tracy Bibbins and **D. E. Harris,** of the Pacific States Electric Company, are making a six weeks' visit in eastern business centers, during which time they will attend the annual gathering at Association Island of the National Electric Lamp Association.

John V. Davies, construction engineer and president of Jacobs & Davies, Inc., of New York City, and **Ralph Modjeski,** consulting engineer of Chicago, have been retained in a consulting capacity to study the possibilities of building either a bridge or tunnel to connect San Francisco with the East Bay cities.

Louis D. Bliss, president of the Bliss Electrical School of Washington, D. C., is a recent Pacific Coast visitor. Mr. Bliss was the official delegate of the Washington section at the recent convention of the American Institute of Electrical Engineers at Salt Lake City. Since the convention he has been visiting in Los Angeles, San Francisco and other Pacific Coast centers.

O. B. Coldwell, vice-president and superintendent of the Portland Railway Light & Power Company, has returned from a visit to eastern business centers. Mr. Coldwell, although vice-president representing the Northwest Division of the American Institute of Electrical Engineers, found himself unable, much to his regret, to attend the convention at Salt Lake City.

R. C. Turner, president of the international Association of Municipal Electricians, was a recent visitor at Colorado Springs, where he conferred with **Joseph Caldwell,** relative to the national convention of the association which will be held in Colorado Springs, September 6 to 9, 1921. Mr. Caldwell is chairman of the local program committee that will arrange details for the coming convention.

D. I. Cone, electrical engineer for the Pacific Telephone and Telegraph Company; **C. P. Osborne,** electrical engineer for the Portland Railway Light & Power Company; **A. H. Breed,** sales engineer for the Pelton Water Wheel Company; **J. B. Fisken,** consulting engineer for the Washington Water Power Company, were among those who represented the various Pacific Coast cities at the recent convention of the American Institute of Electrical Engineers at Salt Lake City.

E. N. Britton, formerly managing editor of Journal of Electricity and Western Industry, has gone to Fresno, California, where he becomes assistant to the general manager of the San Joaquin Light & Power Corporation. Mr. Britton is well known to readers of the Journal of Electricity and to the industry throughout the West. In his new field of endeavor Mr. Britton will have the best wishes of the Journal of Electricity and Western Industry and we look to hear that his activities in the future will continue to bear that same mark of helpfulness to industry toward which all his editorial efforts of the past have pointed.

G. E. Kimball, who has succeeded **R. L. Eltringham** as electrical engineer of the California Industrial Accident Commission, started his electrical experience in 1899 with the Queensborough Electric Light and Power Company, at Far Rockaway, Long Island, and in the shops of the Brooklyn Rapid Transit Company, Brooklyn, New York. Mr. Kimball was employed by the New Bedford and Fall River Automatic Telephone Companies on telephone maintenance and installation, and as automatic exchange attendant in 1900. The exchanges in these two cities were the first automatic telephone exchanges of importance installed in this country. Entering the services of the Automatic Electric Company of Chicago, in 1901, he was employed in the factory and the installation, engineering and experimental departments for a number of years. While in this service he was in charge of several large automatic exchange installations. In 1910 he entered the services of the Bay Cities Home Telephone Company, at San Francisco, as superintendent of equipment, and continued with that company until it was taken over and finally dismantled by the Pacific Telephone and Telegraph Company. He remained in the plant department of the Pacific Telephone and Telegraph Company until 1917 when he became associated with the California State Industrial Accident Commission in the Department of Safety as State Electrical Inspector. He has been active in the administration of the General Safety Orders, Electrical Utilization Safety Orders and General Lighting Safety Orders of this commission, and in the formulation of the revised rules.

John J. O'Toole was elected president of the San Francisco Civil Service Commission for the ensuing fiscal year. He was reappointed the first of July for a term of six years.

Charles G. Johnson has purchased the Central Light & Manufacturing Company of Pe Ell, Wash., and plans to make extensions and improvements on the property.

A. L. Olts, of Seattle, has been appointed superintendent of construction on the Brandon, Oregon, hydroelectric project, and has about twenty men at work on the damsite.

John W. Bowdle, formerly wire chief of the San Diego district of the Pacific Telephone and Telegraph Company, has been transferred to Los Angeles, as switchboard engineer.

Benjamin F. Foss, general manager of the B. F. Sturtevant Company of Boston, is in San Francisco and will spend some time in studying business conditions on the Pacific Coast.

R. H. Ballard, vice-president of the Southern California Edison Company, addressed the Progressive Business Club, of Los Angeles, on the subject of the Colorado River Development.

R. R. Bartlett, Fred M. Hesse and **Fred. D. Weber** have been appointed as members of the Oregon State Board of Engineering Examiners. Their term of office is extended to July 1, 1927.

George L. Hurst, formerly with the Bethlehem Shipbuilding Company, has opened offices as consulting engineer in San Francisco, Cal., and will specialize in dredging and hydraulic engineering.

W. M. Green, engineer of the United States Reclamation Service in charge of the Green River project, has been in Salt Lake City gathering data on the project. He states that two parties are now in the field making additional surveys. The field division of the federal land office has turned over all the records to Mr. Green. This action has also been taken by the Green River Company, which made the preliminary surveys and spent approximately $100,000 on the project.

Spencer Bishop, formerly chief engineer of the Arizona Copper Company, with headquarters at Clifton, Arizona, is a San Francisco visitor and expects to remain permanently in this section of the West.

William S. Edsall, sales manager of the Condit Electrical Manufacturing Company with headquarters at Boston, Mass., is a recent Pacific Coast visitor, and has spent some time at Los Angeles, San Francisco and Seattle.

Percy G. Slingsby, formerly in charge of the Merced Falls and Kittridge power houses of the San Joaquin Light & Power Corporation, has been transferred to Fresno as district foreman. **H. G. Wilkes** has been placed in charge of the power houses.

Herbert H. Cox, station chief of the Eagle Rock Station of the Southern California Edison Company, has been elected chairman of the Los Angeles Section of the A. I. E. E. for the year beginning August 1, 1921. **J. N. Kelman,** president of the Kelman Electric and Manufacturing Company, was elected secretary.

E. F. Scattergood, chief electrical engineer of the Los Angeles bureau of power and light, **William Mulholland,** of the Los Angeles bureau of water works and supply, have returned from a conference with the Federal Power Commission regarding the proposed Colorado River power and irrigation development.

F. G. Baum, consulting engineer of San Francisco, has returned from the Salt Lake convention of the American Institute of Electrical Engineers, where he delivered a paper on high tension hydroelectric transmission, and is now spending several weeks up on the Pit River development of the Pacific Gas & Electric Company.

C. W. Koiner, formerly general manager and electrical engineer of the Pasadena municipal electric light plant, has been appointed city manager for Pasadena with power of administration in all of the departments except that of the library and legal. Mr. Koiner has been manager of the municipal plant for the past thirteen years.

W. R. Putnam, vice-president and general manager of the Idaho Power Co., with headquarters at Boise, Idaho, was elected president of the Northwest Electric Light and Power Association at the annual election held at the close of the recent convention in Portland. Mr. Putnam has been actively identified with the activities of the association for a number of years, particularly through the promotion of merchandise sales. His constructive work as member and as chairman of the electric range committee of the association has marked him a leader in this movement and his ideas are largely incorporated in the policy adopted by the National Electric Light Association in the promotion of electrical merchandising sales. In the troublesome days ahead, salesmanship will be one of the most important attributes of men in the electrical industry. Electrical merchandise and securities of the public service companies must be sold if the electrical industry is to prosper. It is therefore fortunate that a man of Mr. Putnam's ability along these lines has been chosen to direct the activities of the Northwest Electric Light and Power Association for the coming year.

Business Activities in Western Market Centers

SAN FRANCISCO

During the past two weeks there has been evidence of improvement in general business conditions throughout northern California, in spite of the small resumption of building activities. This is considered a favorable indication and has resulted in a noticeable optimistic attitude on the part of business men in general. The resumption of building in San Francisco and the Bay district has been slow; however considerable building is going on, with the exception of a few of the larger business blocks. There is a determined attitude on the part of the builders' exchange that the American plan of operation will be put into effect, and indications that the effort will be successful. The contractors and builders have the support of the business men throughout northern California, Sacramento building men having recently announced their intention of resuming operations on the American plan. There is a large amount of construction work, particularly residence building, being held up as the result of the strike, so that the resumption of building will favorably affect business in general.

It seems to be the consensus of opinion that, with the exception of certain radical labor groups which fail to recognize the necessity of accepting wage reductions proportionate to the reduction in living costs, the most important factors retarding business activities are the lack of confidence on the part of the buying public in the stability of the present prices and the lack of confidence in future economic conditions. The business depression is therefore psychological and dependent upon factors over which it is difficult to exercise control. Anything that will create an optimistic attitude on the part of the buying public and the retail merchant is most important. Leaders in industry are pleading for a normal attitude on the part of the buying public, stating that if everyone would purchase goods in the same amount that they would under normal circumstances, business would result and the present depression would be over. This is good advice.

LOS ANGELES

It seems to be the consensus of opinion in Los Angeles that there are no panic factors present in business conditions. There is no over expansion of bank loans and commercial credits, inventories of consumable goods are smaller than at any time for many months past, and the element of apprehension which tends to shatter business morale is absent. The first two factors can be determined and the statements supported; as to the third, there is only the general and apparent feeling of optimism on the part of business men and the fact that the Federal Reserve ratio has gradually climbed to a safe level. Careful observers are certain that Southern California has safely passed through the worst of the business depression and that better conditions are to be expected in the fall.

The analysis of living costs in Los Angeles made by the Citizens National Bank indicates that, excluding rent, prices are approaching a level which may be represented by $1.50, as contrasted with $1.00 in 1914, and $2.00 during the highest prices of 1920. The cost of rent is conceded to be out of all proportion to other living costs and tends to conceal the decrease in the prices of consumable goods. If the buying public could be brought to the realization that prices are as low as can be reasonably expected and would therefore purchase goods in a normal quantity there certainly would be a revival of business in all lines of industry in the Southwest. Fundamentally, business conditions are sound; but conditions will not become normal until this fact is appreciated and the public again resumes the consumption of manufactured products in a normal quantity and conducts its purchases in an intelligent manner.

SEATTLE

Conditions in the lumber industry of the Northwest are very bad, and no particular improvement is looked for until fall and perhaps later, weekly production and shipment figures as reported being about equal. Improvement in the lumber industry is dependent upon a reduction in freight rates to Eastern markets and an increase in demand throughout the West. There are indications of a resumption of Oriental demand for the larger dimensions. The resumption of building operation in California will materially improve the demand for lumber throughout the Northwest. Building permits for June were in excess of a million and a half dollars, which is about the same as for May; however this fair volume of construction does not materially affect the lumber industry.

Crop conditions continue good and an excellent wheat harvest is expected. Wool buying is active in the interior. These two factors are expected to loosen credits which is essential for a resumption of industrial activity.

There are several encouraging features in Seattle conditions; retail business is on the increase, in dry goods there is an improvement in the volume of trade. There is now being shipped by the wholesalers more goods than at this time last year. Also in the grocery trade the volume of business is greater than at this time last year. In both these lines the most improvement has been shown in the last two months. This is an indication that the basic conditions are sound and it is believed that business will continue to improve. Employment is being found for an increasing number of men.

PORTLAND

Little change is noted in general business conditions here, although there are some hopeful signs of better conditions. The labor situation is much relieved with the advent of the harvesting season, and a slight revival in the lumber industry with a good prospect of further activity soon. Building activity continues, although confined mostly to residences and the smaller commercial structures. Crop forecasts indicate bumper crops in all lines and a general business revival is expected as soon as these begin to move in the early fall. Retail trade is about the same as in recent weeks with special sales stimulating interest. Buying in the jobbing lines is still confined to filling immediate requirements. The marine strike is still on but in spite of this grain cargoes are being cleared for Europe at the rate of five or six a week. Lumber output from Oregon and Washington mills has increased from 68 per cent to 70 per cent normal in recent weeks.

Conditions in the electrical industry are practically unchanged although jobbers report business a trifle improved during the past two weeks. Contractor-dealers seem to feel that the situation is becoming a little more stabilized, although business is still far below normal.

SALT LAKE CITY

There is some improvement in retail trade, and the unemployment situation shows a slight tendency toward betterment, due principally to the fact that in many cases men are securing employment on the farms.

In Salt Lake City building operations during June of this year cost 164.4 per cent of the amount spent in June, 1920, which is considered a fair demonstration of the underlying activity and wholesome economic position of the city. Although it costs, generally speaking, 20 per cent less to build a house this year than it did in 1920, there were permits issued in June showing considerably in excess of the money spent in building a year ago. Most of the new work is being done in the construction of small homes. Mortgage firms report ample money for conservative loans on residential property construction.

There is little change in the situation in the agricultural districts. Crop conditions are excellent, and the farmers in general are encouraged over the outlook, in spite of the fact that farm products will not bring high prices this season. There is, however, some improvement in the agricultural and livestock markets.

In the mining sections conditions remain practically unchanged. There has been much conjecture as to when the production of copper would be resumed, and opinions differ widely, varying in time from three months to two years. Some of the operators, however, state that there is reasonable hope for resumption of operations toward the end of this year. In the silver-lead mining camps conditions are fairly good, and in fact some of the larger properties are maintaining normal production of ore.

HAPPENINGS IN INDUSTRY

ELECTRICAL COOPERATIVE LEAGUE ORGANIZED AT DENVER

Throughout the West the idea of organization to obtain the advantages of cooperation of the different branches of the electrical industry is rapidly spreading, the latest recruit being Denver, Colorado. The new organization is to be conducted along the lines that have proved so successful in other western cities. All phases of the industry are represented, and it is the purpose of the organization to aid the home builder, the merchant, and all citizens in the solution of their electrical problems. An advisory committee representing the contractor-dealers, manufacturers, jobbers and central stations has been formed and officers elected to direct the organization through this committee. The officers are: T. O. Kenedy, chairman; E. C. Headrick, vice-chairman, and John J. Cooper, secretary-treasurer.

MINIDOKA PROJECT TO GET ADDITIONAL POWER

Additional electrical power during the summer will be supplied to the Minidoka project through a three-year agreement entered into with the U. S. Reclamation Service, Boise project, and the Idaho Power Company.

Under this contract, approved by the Department of the Interior, one-half of the output of the diversion plant of the Boise project on the Boise river will be leased by the Minidoka project. The transmission of the energy from the power house to Milner will be over the lines of the Idaho Power Company.

The Reclamation Service will build a transmission line from Burley to Milner, and will install a substation for transforming the power from 44,000 to 30,000 volts. It is expected that about 700 kilowatts will be available to the Minidoka project after the arrangement becomes effective, which is July 1st.

The Boise project reserves the right to purchase the power which it needs for use of its drag-line excavators, for work on the drainage system on that project.

The other half of the output of the Boise power house will be dumped into the system of the Idaho Power Company. The five-year lease which the Idaho Power Company had with the Boise project terminated April 30, 1921.

ELECTRICAL CONTRACTOR AND DEALERS OF YAKIMA ORGANIZE

An organization of contractors and dealers in electrical appliances has been formed in Yakima, and A. J. Gladson has been elected president, with A. L. Fullbright, secretary. Seven firms are members of the organization, as follows: Electric Power & Appliance, The Valley Electric Supply Co., Economy Electric Company, Inland Electric Co., Hillman Electric Co., Estep Electric Co., and W. E. Cobel Company. The organization is affiliated with the state association. The Yakima association will have weekly meetings.

CONFERENCE OF SECRETARIES OF NATIONAL STANDARDIZING BODIES

The secretary of the American Engineering Standards Committee, Dr. P. G. Agnew attended a conference of the secretaries of the national standardizing bodies in London. The conference had for its object an interchange of experience and the furtherance of cooperation between the various national bodies in their work of industrial and engineering standardization. The secretaries will submit the suggestions of the conference to their respective bodies for approval. Arrangements are being made for close cooperation between the national bodies and the International Chamber of Commerce. Special consideration was given to the subject of standardization at the London Convention of the International Chamber of Commerce during the week of June 27, 1921.

EXPERIMENTAL ELECTRICALLY OPERATED VEGETABLE DEHYDRATORS

The problem of the dehydration of fruits is one in which all portions of the West are interested. During the war dried fruits were successfully used to a greater extent than ever before and the demand for these products has continued. The drying of fruits and vegetables in such a way that the flavor and physical characteristics of the fresh material is maintained in the dried product is a difficult problem. Its successful solution depends upon a number of factors, but upon the supply and control of the heat and moisture conditions to a greater extent than others. There is no question but electrical heating is more satisfactory for this purpose than any other method. It is therefore interesting to learn that experiments are being conducted at Modesto, Cal., in the drying of fruit in a dehydrator using electrical heating equipment.

CALIFORNIA RAILROAD COMMISSION APPROVES MERCED POWER PLAN

The State Railroad Commission has approved an agreement entered into between the Merced irrigation district and the San Joaquin Light & Power Corporation in reference to water rights and the sale of electric energy on the Merced river. The power company consented to the establishment of a reservoir and power plant by the district at Exchequer, Mariposa county, and agreed to buy the power at a rate to be fixed by the commission.

Provision was made for compensation to the power corporation if the proposed reservoir should reduce the flow of the river to a degree that would lessen the company's present production.

POWER SECURITIES SALES OF SAN FRANCISCO ELECTRICAL DEVELOPMENT LEAGUE

The sale of the stock of the power companies was undertaken by the League last fall in an endeavor to make every individual connected with the electrical industry in San Francisco and the bay district an owner of stock in one or more of the power companies. The campaign lasted two months. Sales were made by members of teams recruited among the manufacturers, jobbers and contractor-dealers and resulted in the sale of 797 shares of the stock of the Great Western Power Company, the San Joaquin Light & Power Corporation and the Pacific Gas & Electric Company, to over 300 subscribers.

A new power securities sales committee of the League has been appointed, comprising the following men: W. S. Berry, chairman; Sam P. Russell, secretary; C. Felix Butte, Heckert Parker, Earl Alexander, Raymond Alvord and Douglas McMullen.

The above committee has held several meetings to devise ways and means to put on another campaign and will be ready to present their plans in full to the League in time to start a new campaign the first of September. Twenty or

more teams will be organized, known as jobbers, manufacturers, and contractor dealer teams in an effort to secure 1000 new subscribers to the stock of the three power companies. In addition to the actual work of selling by the volunteer team men, the committee is preparing booklets and advertising matter for use during this work, and will present certain recommendations to the members of the League for practical and definite means of applying the spirit of cooperation so that every man and woman directly connected with the electrical industry will be a subscriber.

CALIFORNIA WATER POWER FILINGS ALMOST SEVEN MILLION HORSEPOWER

Permits to develop hydroelectric power now on file with the California State Water Commission total 107. These applications cover 6,802,000 theoretical horsepower and for their development it will be necessary to expend $693,498,000, or approximately $100 per installed theoretical horsepower, according to Charles E. Lee, president of the State Water Commission.

"The companies now engaged in the production of hydroelectric energy," Mr. Lee states, "are planning to spend this vast sum of money to supply California industries with much needed power which can be obtained through no other medium, inasmuch as the other natural resources within the state, such as oil, gasoline and natural gas, already are carrying their maximum load and cannot be depended upon to furnish additional power in the future. California's power problems can be solved only by the more intensive development of the latent powers in her rivers and mountain streams, and it is in this direction that the hydroelectric companies are turning, as indicated by their applications for water power permits."

The following table was prepared by the Water Commission to show the water sheds involved in the filings:

River	Number of Important Plants	Theoretical Horsepower	Cost of Development
American	4	194,000	$ 9,570,000
Feather	8	723,000	86,500,000
Kern	7	347,000	31,620,000
Kings	11	906,000	107,500,000
Klamath	6	499,000	38,300,000
Merced	4	211,000	19,430,000
Mokelumne	3	39,000	1,940,000
Owens	8	164,000	14,508,000
Sacramento and upper tributaries, including Pit River	15	871,000	86,900,000
San Joaquin	14	1,803,000	204,000,000
Stanislaus	4	121,000	4,160,000
Tuolumne	13	614,000	58,370,000
Yuba	10	310,000	30,700,000
Total	107	6,802,000	$693,498,000

Irrigable land in California amounts to a total of 9,699,000 acres, according to the same authority, and applications have been received for the use of water on a total of 10,890,000 acres. Permits have been granted by the commission for the use of water for agricultural purposes on 618,400 acres.

OFFICIAL OPENING OF BONNEVILLE IRRIGATION PROJECT

The official opening of the Bonneville irrigation project was celebrated on July 4, with the gathering of a large crowd which listened to addresses by Governor Maybey of Utah, and participated in an interesting program of various events.

Governor Maybey declared that the Bonneville irrigation district project would result in the regeneration and rejuvenation of Bountiful, and would make it the best of the suburbs of the capital city of the state.

An electric switch was installed on the speakers' stand, and was closed by the governor in token that the electrically operated pumping plant had started raising water from the Jordan River 300 feet up the hillside at North Salt Lake.

"I would rather reclaim one acre of land," said Governor Maybey, "than be a conqueror of a city. Utah has many acres to reclaim, some 17,000,000, and only 5,000,000 have been reclaimed."

Trips were then taken over the district and to the pumping plant, where Oro McDermitt, engineer of the district, and representatives of the Shattuck Construction Company, which built the works, explained the various features of the operation. Many made the climb up the steep hillside to where the water poured from the pipe into the cement-lined canal. The Bonneville irrigation project is one of the largest in the West, and will reclaim thousands of acres of land immediately north of Salt Lake City.

CALIFORNIA LETS $6,000,000 IN ROAD CONTRACTS FOR 1921

New contracts for approximately $6,000,000 for highway construction have been let by the California State Highway Commission during the first six months of this year. Thirty-five contracts have been let, the work is well distributed throughout the state and involves construction in twenty-one counties. Bids for work in other sections are now being called for, and, according to a recent announcement by the commission, an extensive construction program is actually under way.

S.S. TAMIAHUA LAUNCHED AT OAKLAND

The largest merchant vessel constructed on the Pacific Coast, and when designed, the largest oil tanker in the world, was launched July second by the Moore Shipbuilding Company, of Oakland. A record was also made in the time of construction, the vessel being only seventy-six days on the ways. The Tamiahua will be placed in commission about the twentieth of August, and will carry a cargo of about 100,000 barrels of heavy Mexican crude oil, together with stores, etc., for twenty-two days' continuous steaming. The tanker was built for the Atlantic Steamship Lines of the Southern Pacific Company, and will operate between Galveston, New Orleans and New York.

The ship is 520 feet long, over all, and is designed to make 11 knots an hour. She will carry 16,340 tons total dead weight at 28 feet draft.

CALIFORNIA COOPERATIVE CAMPAIGN PASSES RESOLUTIONS AGAINST COMMERCIALIZING "HOME ELECTRICAL" EXHIBITS

Two meetings of the California Electrical Cooperative Campaign during the current month, one in Los Angeles and the other in San Francisco, were called especially for the purpose of protesting against the advertisement which appeared over the signature of the Bryant Electric Company on the front cover of Electrical Merchandising for June, 1921. According to members of the Advisory Campaign Committee the statements as there set forth are not true and above all are not in accord with the spirit of the Campaign; hence the following resolution was unanimously passed:

"Whereas, Among other things the California Electrical Cooperative Campaign has been organized purely to promote a better understanding of the uses of electricity in the home and in no manner to endorse any particular manufacturer's product,

"Therefore, Be It Resolved, That we, the members of the Advisory Committee of the California Electrical Cooperative Campaign, most emphatically protest against such advertisement as appeared over the signature of the Bryant Electric Company as instanced in that of the front cover of Electrical Merchandising for June, 1921, since the statements contained therein not only violate the principles of the Campaign, but are not based on fact.

"And, Be It Further Resolved, That the Bryant Electric Company be requested to make full retraction of the statements contained therein."

NOTED ENGINEERS REPORT ON SAN FRANCISCO-OAKLAND BRIDGE

Industry in and about the central part of California is very much awake to the possibilities which will result from bridging the distance between San Francisco and Oakland. It will cause the development of that section of the West as perhaps nothing else could. Two of the nation's most noted engineers, J. Vipond Davies, who built the Hudson River Tunnel, and Ralph Modjeski of Chicago, who is an authority on bridge engineering and construction, have been employed to make a report on the situation. Their report recommends a 3500-ft. tunnel on the San Francisco side, connecting a bridge 11,500 ft. in length, a 3500-ft. pile trestle and 12,000 ft. of fill or mole; this connects the civic centers of San Francisco and Oakland by a distance but slightly more than one mile longer than an air line between the two, or about 9.4 miles. The project completed as outlined would cost in the neighborhood of $40,000,000. As to whether this plan is the one that will be ultimately used or not, no one is able to say at present. The fact remains, however, that there is a great deal of interest in the subject and people of the bay communities have resolved that the discussion shall continue until definite action be taken in the matter of bridging the San Francisco Bay.

GAS APPLIANCE SOCIETY OF SAN FRANCISCO ORGANIZED

The retail gas appliance people of the San Francisco Bay district have organized the Gas Appliance Society, and will hold weekly luncheons at the Stewart Hotel. The object of the society is to promote the sale and use of gas appliances through cooperation and publicity and by a campaign of education.

PORTLAND HAS NEW INDUSTRIAL COMMITTEE

Industrial activities of the city of Portland will be under the care of a new managing committee of the department of industries of the chamber of commerce. The board of directors has announced the personnel of the new committee to be: W. P. LaRoche, chairman; L. T. Merwin, J. H. Gallagher, A. H. Devers, Davis S. Sterns, L. R. Wheeler and F. H. Strong with J. D. Abbott, ex-officio from the board.

NORTHWEST ELECTRICAL SERVICE LEAGUE OPENS OFFICES

Under the leadership of Stephen I. Miller, secretary-manager of the League, offices have been opened at 535 Central Building, Seattle, Washington. The field man for Washington has been appointed and the representative for Oregon will be appointed within a few weeks.

OGDEN, UTAH, HAS MODEL ELECTRICAL HOME

Ogden's model electrical home, near Tyler Avenue and Twenty-sixth Street, was opened for the first time to the general public the latter part of June. The visitors found in the home a complete showing of the latest and best methods of installing a modern home lighting system and a large number of electrical labor-saving devices. From the beautiful light fixture at the front entrance to the lighting switch at the garage door, in the basement, the electrical equipment is complete.

The living room, with its large fireplace and bookcase, is made cozy with electrical conveniences, including electric player piano and electrically driven phonograph. The lighting fixtures are of the very latest type, both ceiling, wall and stand lights. The electric outlets for the stand lamps, for the vacuum cleaner and other conveniences, including spot light heaters, are installed in the most convenient places. Lights for the room can be turned on or off at either of the entrances, from the front or from the back wall. Adjoining the living room is the dining room, where both the dining table and the tea wagon are equipped with four-way convenience plugs, which can be used for that number of electrical table articles. There are convenience outlets in the baseboards, at the side of the sideboard, and under the dining table, which can be used as desired. In the kitchen the electric range is installed and there are convenience plugs at the kitchen cabinet and in the side wall for the electric dishwasher.

The three bed rooms have convenience outlets so arranged that heaters, heating pads, electric curlers, hot water heaters and similar devices can be attached or lights placed at the side or over beds, while the vacuum cleaner is equally available. The bathroom has sidelights for the mirror, and convenience outlets to handle heater, curler, hot water and other equipment. Closets are electrically lighted, one in which lights automatically turn on when door is opened and off when door is closed. Laundry equipment in the basement, entirely of the electric type, is shown as conveniently installed, with electric heater on the hot water tank, electric washer, electric dryer and electric ironer, together with electric iron and iron board.

The home was built by L. B. Swaner, and the companies that have joined in the enterprise are The Lighthouse, Utah Power & Light Company, Redfield Electric Company, Larison Electric Company and Ogden Electric Supply Company.

WESTERN FARMERS CONFER IN PORTLAND

Marketing conditions and problems of a similar nature formed the subject matter of the discussions before the 200 delegates from marketing organizations of California, Washington, Montana, Idaho, Utah and Oregon at the convention held in Portland, July 11 to 14, sponsored by the farm bureaus from six states. W. B. Armstrong of Yakima, president of the Washington Farm Bureau Federation, was chosen to act as chairman of the sessions and H. L. Hull, also of Yakima, was elected as secretary.

CALIFORNIA INDUSTRIAL CENTERS TO HAVE UNIFORM SWITCHING CHARGES

The acceptance by the Southern Pacific Railroad Company of the State Railroad Commission's plan of uniform switching zones and charges for the state's chief industrial centers, ends a controversy that has been before the state body and the Interstate Commerce Commission for four years. Not only is the order of the commission as to South San Francisco, Oakland and Los Angeles, now in effect, but the railroad company has voluntarily adopted the recommendation of the commission that the same schedule be applied to Oakland-Alameda, Oakland-Berkeley and Berkeley-Emeryville switching territory. Six large industrial zones are now on an equality as to distances and rates and a substantial reduction in charges is effective.

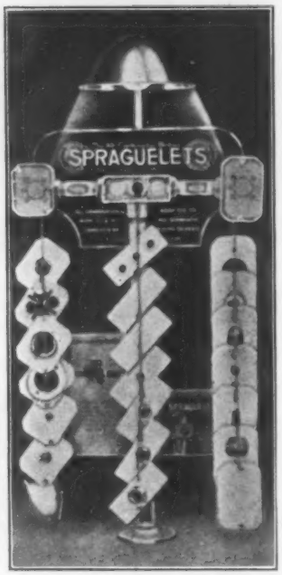
The acceptance of the commission's order and recommendation is indicated by the Southern Pacific Company's publication of the switching tariffs, and this puts an end to reports current when rehearing of the case was denied June 30, that the railroad company intended to carry the issue to the Interstate Commerce Commission and also to appeal to the courts.

In the original proceeding, popularly known as the South San Francisco switching case, Alameda, Berkeley and Emeryville did not intervene and therefore only a recommendation could be made by the commission as to them. The voluntary adoption of this recommendation by the Southern Pacific Company will, in the opinion of the commission, be of great benefit to the industrial development of the trans-bay cities.

Trade Notes

New Exhibit Demonstrates Interchangeability.

A manufacturer of wiring materials has recently devised an attractive means of transferring its "still life" exhibit from the contractor-dealer's wall to his counter. One of the most important features of the exhibit is that it permits the interested customer to try with his own hands various combinations of the fittings or devices under consideration, so that he is no longer obliged to look at the separate parts from a distance and visualize their relationships.



Live exhibit for the dealer's counter

This display is illuminated so that it forms a useful purpose on the counter or table of a distributor or contractor-dealer in lighting the counter at a place where more light would be welcomed by the clerks.

Those who have seen this exhibit predict that it will prove a very effective "silent salesman" because it capitalizes the drawing power of illumination and that curious human instinct to acquaint itself with products and possibilities through direct handling.

Western Agencies, Inc., Move to New Location —

Western Agencies, Inc., are moving their offices and stock of merchandise to their well-equipped new home at 711 Mission Street, San Francisco. This concern is factory representative for Rutenber Motor Company, R. Williamson Fixtures, and other lines of electrical appliances. The feature of the new location will be a large display room with electric ranges and other appliances actually connected up for demonstration purposes.

Salt Lake City Architects Affiliate with American Institute

National affiliation with the American Institute of Architects by the local chapter of architects has just been completed, under the direction of Burton E. Morse of Twin Falls, Idaho, and G. Y. Cannon, of Salt Lake City, who attended the national convention of the institute at Washington, D. C.

Coast Equipment Company Is Incorporated —

The Coast Equipment Company, of San Francisco, industrial engineers and factory representatives, has recently been incorporated with the following directors: H. S. Tittle, Robt. Dalziel, Jr., L. A. Somers, Thomas Harris and Alfred Potbury. The elected officers of the company are: H. S. Tittle, president; L. A. Somers, vice-president; Alfred Potbury, secretary-treasurer. L. A. Somers is general manager, and Alfred Potbury chief engineer. The company has offices in San Francisco, Los Angeles, Portland and Seattle.

Berkeley Has New Electrical Store —

The Edison Electric Company, under the proprietorship of R. V. Oyler, has opened a store at 2082 University Avenue, Berkeley, California. A formal opening took place on July 9.

Scandia Pacific Oil Engine Company Changes Name —

Scandia Pacific Oil Engine Company announces that beginning with July 1st it will operate under the name of Pacific Diesel Engine Company and devote its entire plant to the manufacture of marine and stationary Diesel engines.

Seattle Has New Engineering Firm.

The Morford & Mowry Engineering Company, of Seattle was recently organized with the intention of specializing in irrigation, drainage and municipal work, such as water supply and sewer systems. The firm is composed of Samuel Humes, formerly King County Engineer, Carl E. Morford, formerly assistant county engineer and Charles P. Mowry, office manager of the King County engineering department, under Engineer Humes. The firm is now engaged in a diking project, involving 7,000 acres of Skagit Bay lands for the Skagit Bay Lands Company. Offices are maintained in the Lyon Building.

Mees & Mees Have New Location.

In order to provide more adequate space to properly take care of their rapidly expanding business, Mees & Mees, consulting engineers and industrial architects have taken offices on the third floor of the Kinney Building, Charlotte, North Carolina.

MEETINGS OF INTEREST TO WESTERN MEN

Jobbers' Convention at Del Monte

The Pacific Coast Division of the Electrical Supply Jobbers' Association held a very successful meeting at Del Monte, June 6 and 7, immediately preceding the convention of the N. E. L. A. The meetings were devoted largely to the sales possibilities of labor-saving devices, the marketing problems and other conditions affecting the wider distribution of this class of appliances.

One of the most important papers was presented by D. E. Harris, vice-president and sales manager of the Pacific States Electric Company, in which he showed by means of charts the total number of labor-saving devices marketed in the West by the jobbers during 1920, and the total kilowatts installed on power company lines. Burrel S. Manuel, general manager of the Electric Railway & Manufacturing Company, gave an informative paper on the sale of this class of appliances and some of the problems to be overcome.

In the open meeting, conducted by Percy Booth, Pacific district manager of the Edison Electric Appliance Company, a general report was presented which consisted of a review of conditions in connection with the sale and distribution of labor-saving devices. The report was subdivided under the following headings: market conditions, factory and stock conditions, sales possibilities in various lines, methods of distribution, and, other points and problems. The report was particularly helpful and should result in increasing the sale of electrical appliances.

One of the most important phases of the jobbers' activities during the continuance of slack business is more intensive salesmanship as well as better service to the purchaser. That this situation is appreciated by the men in attendance at the convention was brought out through the discussion of the various papers. The satisfactory volume of sales of certain lines of appliances upon which sales emphasis was placed supports this contention.

It is proposed to hold the next meeting at Paradise Inn, Mt. Rainier National Park, August 30, 31, and September 1. This is somewhat provisional, depending upon the number that indicate their intention of attending.

San Francisco Section A. I. E. E. Entertains A. W. Berresford, President of the Institute

On the evening of July 6th at the Engineers' Club was held a banquet in honor of A. W. Berresford, president of the American Institute of Electrical Engineers. Robert Sibley, editor of Journal of Electricity and Western Industry and vice-president of the Institute, acted as toastmaster, introducing Mr. Berresford as one not only of interest to Institute members due to his prominence in the Institute, but also particularly of interest to the West, as Mr. Berresford has done so much in the development of safety apparatus and protective devices for industry throughout the nation. Mr. Berresford brought home the point in his address that the Institute is doing everything possible to stabilize the local section's activities, and he urged that these activities be given as much emphasis as possible by the local members. He recounted many instances in which the Institute is endeavoring to bring home to the members the appreciation the governing body has for this development. Mr. Berresford sees great possibilities in the development of the Pacific Coast, and particularly the development of the Institute activities on the Pacific Coast.

On Friday afternoon, July 8, the San Francisco Section were the guests of the U. S. S. Tennessee, at which time an inspection of the electrical equipment of this electrically appointed vessel was thoroughly reviewed, and the efficiencies of the modern drive electrical brought home to the members.

Successful Contractor-Dealer Meeting at Eugene, Oregon

The annual meeting of the Oregon Association of Electrical Contractors and Dealers proved to be of unusual helpfulness this year. Better business methods and more satisfactory service to the public were the keynotes of the convention. The latter has been brought about through the efforts of the state association, A. C. McMicken, sales manager of the Portland Railway, Light & Power Company, told the delegates, by obtaining a close cooperation among the dealers and contractors that resulted in better business conditions. M. H. Aylesworth, executive manager of the N. E. L. A., addressed the delegates in his usual forceful and helpful manner. Robert Sibley, editor of Journal of Electricity and Western Industry, gave an illuminating talk on the industrial growth of the West, showing that the growth of the West is dependent upon the increase of hydroelectric development.

Portland's plans for the Atlantic-Pacific Highways and Electrical Exposition were the subject of a talk given by John E. Gratke at the banquet held at the Hotel Osburn. G. E. Armstrong, Pacific Coast editor of Electrical World, spoke on the subject of the "Electrical Press."

L. B. Sigwart won the association cup in the first annual golf tournament. The contractor-dealers won the ball game from the jobbers in the annual ball game.

Rocky Mountain Electrical Cooperative League

The regular monthly meeting and luncheon of the Rocky Mountain Electrical Cooperative League was held on June 20th. One of the features of the meeting was a demonstration talk by Mrs. Louise Palmer Webber, electric cooking school demonstrator, of Portland, who demonstrated some methods of selling electrical appliances to the ultimate user—the woman of the house. Mrs. Webber emphasized the importance of having all branches of the industry cooperate, and recommended the employing of one or more efficient lady demonstrators to assist in working up prospects among the housewives, and also demonstrating the use of appliances after they have been sold. Mrs. Webber spoke of the Electrical Exposition to be held in Portland in 1925, and stated that the West and the Northwest were going to take a very prominent part in it.

John C. Jones, manager of the Westinghouse Company's Los Angeles branch, and Harry D. Randall, manager of the General Electric Company at Denver, were guests. Mr. Jones told of what has been accomplished by the California Cooperative Campaign, and complimented the Rocky Mountain Electrical Cooperative League on the way they are working together.

San Francisco Development League Enthusiastically Supports All Year Session

At the meeting of the San Francisco Electrical Development League held in the Palace Hotel on July 11th, it was emphatically voted to hold meetings of the league throughout the year and not to dispense with the meetings during the summer months as has hitherto been the practice. There is no question but the future meetings will continue to be very successful; this being an assurance as the result of the enthusiasm shown in voting. The speaker of the day was Dr. George E. Pomeroy, who discussed the Armenia-Turkey relations. Dr. Pomeroy has spent some time in the near East and gave a very clear exposition of the Turkish viewpoint on the atrocities that have taken place during the last several years. Ed Cutting, former president of the league and formerly Pacific Coast manager of the Edison Storage Battery Company, made a few remarks, complimenting the league upon the splendid growth that has taken place during the last two years.

Idaho Reclamation Association Holds Convention

Idaho reclamationists, nearly 300 strong, met in the chamber of commerce chambers on June 13, and decided that the work of the Idaho Reclamation Association, founded by the late Major Fred R. Reed, should be carried on in a greatly enlarged plan.

At the afternoon session Governor D. W. Davis of Idaho gave a stirring address on "Federal Aid for Reclamation," and State Reclamation Commissioner W. G. Swendsen spoke on "Economic Use of Idaho Water Resources." Appealing addresses to continue the work of the association were made by E. F. Ayers, secretary of the Idaho Chapter, American Association of Engineers, Guy Flemmer of Boise, Will H. Gibson of Mountain Home, and others. At the business session following the afternoon meeting, glowing tributes were paid to the work of Major Reed.

The sessions were presided over by S. E. Brady of Pocatello, president of the Idaho Reclamation Association. Addresses at the morning meeting were made by E. F. Ayres of Boise, and President Brady, with the address of welcome by W. R. Siders and the response by Will H. Gibson. The afternoon session was addressed by Governor Davis, Commissioner Swendsen, R. M. Patrick, attorney for the American Falls project, and C. W. Wells of Denver, general commissioner for the western land office.

The board of directors for the coming year was chosen before the afternoon session adjourned. The new members are: Arthur Beymer, Rupert; Dr. W. F. Howard, Pocatello; John E. Pincock, Madison; F. E. Johnson, Boise; P. C. Meredith, Buhl; Senator I. E. Rockwell, Bellevue. The holdover members of the board are J. M. Thompson, Caldwell; C. E. Oles, Idaho Falls; E. K. Hayes, Emmett; S. Grover Rich, Burley; C. Ben Ross, Parma; J. T. Young, Pocatello; E. M. Whitzel, Dubois; Senator F. R. Gooding; W. H. Gibson, Mountain Home.

COMING EVENTS

NATIONAL ASSOCIATION OF ELECTRICAL CONTRACTORS AND DEALERS
Annual Meeting—Buffalo, N. Y., July 18-23, 1921

INTERNATIONAL ASS'N OF MUNICIPAL ENGINEERS
Colorado Springs, Colo.—Sept. 6-9, 1921

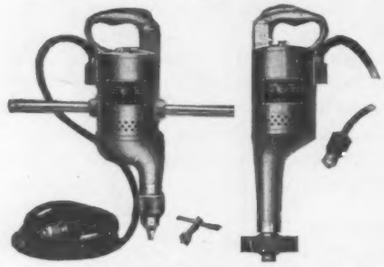
AMERICAN ASSOCIATION OF PORT AUTHORITIES
Annual Convention—Seattle, Wash., Oct. 11-14, 1921

LATEST IN APPLIANCES AND EQUIPMENT

(Small motors for a wide variety of uses have been recently introduced by a number of manufacturers. New types of lighting units for specific conditions are now available for the illuminating engineer. Lighting fixtures are described in two recently issued bulletins.—The Editor.)

PORTABLE ELECTRIC DRILL AND GRINDER

There are many uses for portable electric drills and grinders; more particularly the grinders are used in foundries for cleaning up castings and in general machine shops for smoothing repairs made by welding, portable electric drills may be employed for a multitude of uses for repair work. In such service the reliability of the equipment is an important item. Drills and grinders of the portable type put out by the Wodack Electric Tool Corporation are of high grade construction and have special features that commend their use.



The illustration to the left is of the Wodack portable electric drill, ½-inch size. The motor is of the universal type and the drill is equipped with automatic switch. The portable grinder is of the same general construction.

FRACTIONAL HORSEPOWER BALL BEARING MOTORS

An increasing demand for high grade motors for application to domestic appliances, pumps, machines and other devices which are operated from lighting circuits is met by a complete line manufactured by the Ohio Electric & Controller Company. The motors are ball bearing, thereby eliminating friction to a maximum degree and providing for ease in lubrication. Particularly efficient ventilation is also a feature of these motors.

ELECTRIC BUFFER AND GRINDER

Buffers and grinders in which the wheel is attached to the spindle at either or both ends find important applications in the machine shop, tire shops and other places for grinding, buffing and polishing. The individual motor drive has many advantages over the belt driven machine. A substantial and well designed line of buffers and grinders has been developed by the Valley Electric Company, of St. Louis. The motors are dust proof, the end plates are solid and fitted with SKF self-aligning, double row ball-bearings. A high and low type stand is optional equipment for all sizes of motors, from ½ to 5 hp. Either 3600 or 1800 rev. per min. motors also are optional.

DINGS MAGNETIC TYPE SEPARATOR

The Dings magnetic pulley type separators are short center conveyors driven by magnetic head pulleys. When coal is handled upon a long inclined conveyor, it is necessary to provide ample driving surface by using a large diameter pulley. It is also necessary for economy to use high speeds and heavy cross-section load. Under such conditions it is more economical to deliver to a wider and slower speed short center conveyor with a small diameter magnetic head pulley. The savings that result from the use of magnetic pulleys lie principally in the insurance from shut-downs, and the new type of apparatus is provided to make possible the obtaining of this insurance at a minimum cost.

FUSED ENTRANCE SWITCH

The Westinghouse Electric & Manufacturing Company has recently placed on the market a fused entrance switch. This switch is rated at 100 amperes, and 2500 volts, and is made in two and three poles single throw. These switches are principally used by distributing companies at the end of their 2500-volt distributing lines, and at the entrance of the line to the customers plant.

This switch has a maximum of safety first features. All live parts are completely enclosed in pressed steel case and tank. The leads go in through fibre bushings, and the cover is interlocked so that it cannot be opened when the switch is closed. The fuses are entirely cut off from the line when the switch is open.

The switch is primarily an oil immersed knife switch with fuses mounted in the top. The contacts are a special self-aligning knife blade type. The moving contacts are carried on a wooden drum. The fuse clips are also self-aligning and are mounted on a heavy wooden base, and are designed to take standard fuses.

The switch has a large application on high voltage distribution where safety first features not contained in the ordinary knife switch are desired.

ENCLOSED MAGNETIC STARTING SWITCH FOR SMALL A.C. MOTORS

An improved type of enclosed magnetic starting switch for small a.c. motors has recently been developed by the General Electric Company. They are for use with motors of from 3 hp., 110 volts up to 5 hp., 220, 440 and 550 volts. The switches are suitable for use with momentary contact start and stop push button stations, or snap switches, float switches, pressure governors, thermostats, etc.

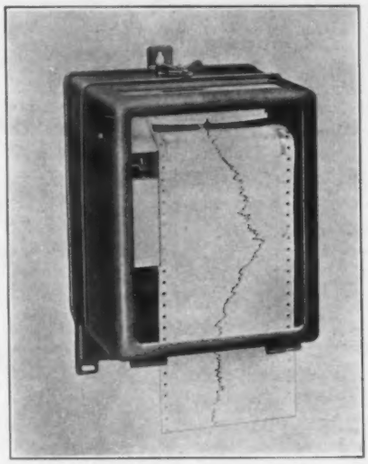
The apparatus consists of an operating magnet, contactor, and protective plugs, all mounted on a sheet steel base and enclosed in a case with a cover hinged at the top. The operating magnet is wound for full line potential, is waterproofed, and easily removable from the front.

The protective device is in the form of two removable inverse time element protective plugs, which safeguard the motor against overloads ordinarily met in service.

The switch is very easy to install, being provided with three knockout holes at the top and two at each side for ¾-inch conduit. They also have holes for mounting screws in the back plate. All parts are very easy of inspection, and renewal of vital parts is a very simple matter, owing to their accessibility and design.

A GRAPHIC KVA. METER

There has been an insistent demand for a kva. meter on the part of power companies, as it is generally recognized that the cost of serving a power consumer is affected by the power factor of his load, and rates are now being put in effect which take the power factor into account. An instrument has been developed by the Esterline-Angus Company which records graphically kilovolt-amperes by maintaining a fixed phase relation between the field produced by the current and that produced by the voltage. The company also announces the production of two other new instruments: a graphic a.c. ohm-meter which records graphically the alternating current resistance of liquids, the concentration of solutions or density of electrolytes, for use in boiler rooms, rooms, chemical plants or water plants; a portable concentration meter for showing the concentration of salts in water for use in boiler rooms and water-softening plants.



Graphic kva. meter showing chart and type of record recorded upon paper. Note the legibility. The dial at the top shows the instantaneous consumption.

LIGHTING UNITS THAT ADD TO EFFICIENCY OF ILLUMINATION

The Benjamin Electric Manufacturing Company, of Chicago, has recently brought out three new industrial lighting fixtures that possess certain advantages under special conditions for which they are designed.

Under conditions demanding a high degree of visual acuity it has been found that the Mazda C lamp with a filter to remove certain deleterious rays is superior to good north daylight because it is possible to obtain correct illumination invariable in intensity and quality. Under these conditions the eye need only adjust itself to one intensity of illumination of invariable quality. There has been difficulty in adapting glass discs to industrial lighting equipment, which has been overcome in the "Dalite" unit. The "Dalite" glass discs are attached by means of suitable holders to the regular 8, 9, 10 and 12-inch standard Benjamin porcelain enameled steel reflectors. These holders are hinged, making it a simple matter to clean both sides of the glass disc.

The by-products of manufacturing processes in many industries form dense clouds of heavy dust and other foreign material, which settle upon the reflectors and lamps, necessitating frequent cleaning in order that a high level of illumination may be preserved. Unless special provisions are made for cleaning, the neglect results in seriously impaired illumination, and in time brings about deterioration of the lighting units. The Type RR Threaded Fixtures overcome any difficulties involved in cleaning, and present several other very convenient and highly desirable features. The fixtures are made with cast hoods, designed to accommodate threaded reflectors of the R.L.M. dome standard, bowl and symmetrical angle type. The threaded connection permits easy removal of the reflector from the hood for cleaning. That is, the reflector simply unscrews from the hood.

There is a wide variety of industries where lighting equipment is operated under conditions where gases, vapors, dusts or other explosive or inflammable materials are apt to accumulate.

Illumination other than natural lighting is extremely difficult under these conditions, and many efforts have been made to render artificial lighting entirely safe. So important is this consideration that in many states there are ordinances and regulations which seek to eliminate the life and fire hazard, compliance with which has been reached with great difficulty.

The Benjamin Electric Manufacturing Company has developed a gas and vapor-proof unit of the heavy duty type which meets every requirement and makes electrical illumination, safe as it ordinarily is, still safer under the conditions named in our first statement.

The unit is sealed against the entrance of foreign material, both at the conduit and at the globe. These are the only two places where joints are made, thus effectively sealing the fixture against entrance of anything from the outside. Hot electrical parts cannot come in contact with explosive or inflammable material. If the lamp breaks, a fire or explosion will not ensue even if the premises contain inflammable gases, dust or kindred material, because the lamp bulb is enclosed tightly within a vapor proof globe. The hood is made of cast metal, finished in green enamel. The reflector is porcelain enameled steel. These, together with the glass globe, constitute material which is entirely unaffected by fumes which would tend to destroy an ordinary fixture.

Books and Bulletins

Third Power Kink Book

Compiled by the Editorial Staff of Power. Published by the McGraw-Hill Book Co., Inc., New York. 264 pp., 6 x 9, illustrated. Price $1.50.

A collection of short articles from "Power," describing kinks which have proved valuable as time and money-savers in power plant work. Each kink is described in the words of its inventor and practically every one of the three hundred kinks is accompanied by a chart or diagram that makes the subject doubly clear. The book helps power men to meet emergencies and to avoid shut-downs. The book is divided into chapters dealing with kinks for various parts of the power plant and is completely indexed.

Lighting for Eye Comfort

An attractive illustrated booklet with the title "Lighting for Eye Comfort," has recently been issued by the National X-Ray Reflectors Company. It shows the effects produced by the various types of lighting equipment in public buildings, offices and in the home. The pamphlet is of value to architects and others interested in better illumination.

The Secret of Entrancing Light

Home illumination is receiving much attention by all branches of the electrical industry. Improved lighting fixtures for the home must be attractive in appearance, blend with the scheme of decoration and be an efficient means of illumination. The Lightolier Company, of New York, has issued an illustrated pamphlet describing their line of home lighting fixtures, with suggestions for the type of fixture best adapted for the lighting of the different rooms in the home. The purpose of the booklet on "The Secret of Entrancing Light," is to point out the many opportunities in lighting in every home, and to show how light can be used as an aid in securing the desired lighting effects and decorative schemes.

Recent Westinghouse Bulletins

The folders and pamphlets issued by the Westinghouse Electric & Manufacturing Company are always of interest to the men in the electrical industry. A leaflet on space heaters for commercial and domestic heating illustrates and describes the construction and distinctive features, as well as the application of these heaters and lists over one hundred specific uses. Folder 4456, entitled "Fans for Efficiency," describes the "Venturs Fans." "Control Apparatus" is the subject of a leaflet listing type F magnetic-switch double-section control panels, together with type 22-F magnetic-switch control panels. "Motorize Your Work" is the title of a folder on motors illustrating several of the smaller motors manufactured by the company.

Power Factor Improvement

Several large cement concerns, a flour mill and two or three pulp and paper mills have been able to improve the power factors on their power system by the installation of synchronous motors and C-H Magnetic Clutches. The Bessemer Limestone & Cement Company has installed seven synchronous motors and magnetic clutches for driving compeb bills, the high static friction of the mills being overcome by means of the magnetic clutch. The synchronous motors are allowed to come up to speed before the clutch is energized. The short interval of time which it takes for the magnetic pull between the clutch surfaces to attain its full strength allows sufficient slip to secure a smooth start.

In the case of a rubber mill, 600 hp. was needed for new plant equipment. The power plant was already overtaxed and the power factor was down to about 65%. By installing a synchronous motor, the power factor was increased to 80% and the generating plant was so relieved that there was sufficient capacity to take care of the full 600 additional horsepower which was necessary. A C-H Magnetic Clutch permits the motor to be brought to synchronous speed before the load is applied.

A booklet on C-H Magnetic Clutches, published by the Cutler-Hammer Manufacturing Co., illustrates a number of large installations where these clutches have permitted the use of synchronous motors on loads whose starting torque is so high that synchronous motor drives have never been considered practical.

Synchronous Condensers

The use of synchronous condensers for power-factor correction is familiar, but their use for power-factor control is not so well known, although the largest condensers built are applied to this service. The General Electric Company has standardized a complete line of sixty-cycle condensers for power-factor control to meet the demand for a comparatively inexpensive, high speed machine. The machines are of light construction and possess other features which permit a reduction in the amount of material required and they can consequently be produced at a lower cost. Calculations necessary in figuring on a synchronous condenser installation, a wiring diagram, and other data are included in an illustrated bulletin which describes this line of apparatus.

Discussion of the National Electrical Safety Code

The Bureau of Standards, Department of Commerce, has issued a new publication, Handbook No. 4, entitled "Discussion of the National Electrical Safety Code."

The publication contains a discussion of the rules of the National Electrical Safety Code as published in Handbook No. 3. The discussion is intended to give the reasons for inserting some of the rules, to aid in the interpretation of the rules, to give suggestions as to how the rules may be applied and suggestions regarding practice involved in the rules. In the present edition it has been segregated under a separate cover from the rules themselves. This discussion was originally included in Circular No. 54, but has been amplified and considerably extended in scope.

NEW ELECTRICAL and INDUSTRIAL DEVELOPMENTS

(A new range boiler factory, a new veneer mill and irrigation developments are interesting news from the Northwest. An enlargement of the Columbia Steel Company's rolling mill, a new wire mill, several new industrial plants and hydroelectric projects are developments of importance in California. Several power and irrigation projects are proposed for the Intermountain district.—The Editor.)

THE PACIFIC NORTHWEST

TACOMA, WASH.—The Buffelen Lumber & Manufacturing Company is erecting a $160,000 veneer factory, a $150,000 power house and a $50,000 planing mill.

CHELAN, WASH.—The Chelan Electric Company, which supplies water for domestic purposes in Chelan, is now engaged in laying new water mains, at a cost of more than $100,000. The company turns its excess water over to adjoining orchards for irrigation purposes.

OLYMPIA, WASH.—The act of the last legislature requiring public service corporations to secure certificates of necessity before entering competitive fields will be submitted to a referendum vote, as the requisite number of signatures has been filed with the secretary of state.

RIDGEFIELD, WASH.—The large electrically driven shingle and lumber mill of Bratlie Brothers, Inc., which was forced to suspend operations over a month ago on account of the highest water since 1894, has resumed operations with a full crew, about 40 men. Very little material damage was done to the mill by the water.

CENTRALIA, WASH.—The City Commission has passed a final reading of an ordinance providing for the erection of a $75,000 plant and office building for Centralia's municipal light department, and authorizing the issuance of bonds to pay for construction. Construction bids will be called as soon as the plans have been completed by the architects.

KLAMATH FALLS, ORE.—The sawmill of George Christie & Sons, known as the Christie Mill, located eight miles west of this city at Long Lake, was destroyed by fire July 12th. The loss is estimated at approximately $30,000 with about $10,000 insurance. The lumber yard, containing some 700,000 feet, was saved only after a hard fight by about twenty men.

OLYMPIA, WASH.—Appeal to the Supreme Court of the United States of a suit to test the validity of the new law in this state against alien ownership of land was forecasted when the State Supreme Court, which recently upheld the act, was served with a writ of error. The case was started by Yamshita and others against Secretary of State J. Grant Hinkle.

SEATTLE, WASH.—Reduction in wages of about 20 per cent, 4 per cent less than the cut fixed by coal operators, has been recommended in a report to Edward Clifford, director of the State Department of Labor, by a special committee appointed to suggest means of settling the strike which has closed practically every mine in the state of Washington since March

VANCOUVER, B. C.—The Coast Breweries of California, recently incorporated as an extra-provincial concern with capital of $250,000, has purchased a site on Granville Island, on which it proposes to erect a brewery plant costing $150,000. The brewery building will cost $75,000 and the remainder will be spent in equipment. Capt. John McLellan, Vancouver, represents the firm in Canada.

YAKIMA, WASH.—With the beginning of the government's fiscal year another $400,000 was available for storage construction at Rimrock, but for the present there will be no increase in the force employed. John Rolfson, representing a New York firm, has arrived to superintend work on a hydroelectric plant for which his firm has a contract. Most of the machinery is on the ground and the rest is at Noches City, awaiting transportation to Rimrock. The June payroll includes 325 men and amounts to $240,000.

OLYMPIA, WASH.—That no irrigation district will be organized to draw water from Rock lake, Whitman county, was the decision made by Dan A. Scott, director of conservation and development, following an investigation by State Engineer Lars Langlow and Marvin Chase, superintendent of hydraulics. The investigation showed that the proposed district would contain 58,300 acres of which only 35,000 was considered suitable for irrigation, while but 10,000 was under gravity flow. Scott said that such a district was not practical. All state lands included in the district were withdrawn by Land Commissioner Clark V. Savidge.

RITZVILLE, WASH.—A petition for the creation of an irrigation district in the southeast part of Adams county has been presented to the county commissioners. The sponsors plan on getting water from Rock lakes and contend that about 35,000 acres in Adams county can be irrigated from this project. Some opposition to the proposed district developed, the state engineers contending that only about 10,000 acres in the district was suitable for irrigation and that this would make the cost of the project too high to be practicable. After hearing both sides, the commissioners took the case under advisement and another hearing will be held July 25th.

SEATTLE, WASH.—The National Steel Construction Company, owned by John Wilson, has established in the company's Duwamish Waterway plant a complete range boiler factory, the first west of the Rocky mountains, it is stated. The plant has capacity of 80 range boilers a day, built especially for the high pressure of the city water systems of the Coast. The plant is located in the company's former steel shipbuilding plant, and equipment has been added to provide a galvanizing plant, steel pickling plant and special boiler manufacturing machinery. The company plans to expand the factory until it is supplying the Northwest markets. In the meantime, the company will continue in the steel construction and shipbuilding industry, handling such contracts as are available in this line.

THE PACIFIC CENTRAL DISTRICT

VISALIA, CAL.—A report is being prepared for the proposed water system for the city of Visalia, to cost $200,000.

HANFORD, CAL.—The Lacey Milling Company is having its plant greatly enlarged. A spur track is also under construction.

BAKERSFIELD, CAL.—Plans are being prepared for the proposed municipal water system for the city of Bakersfield, estimated cost $600,000.

MARYSVILLE, CAL.—The substation of the Northern Electric Railroad at East Nicholau, near here, was destroyed by fire July 10th, resulting from a short-circuit. Loss is placed at $10,000.

OAKLAND, CAL.—The Richardson Welding & Manufacturing Company has moved to the site occupied by the Pacific Coast Shipbuilding Company.

ANGELS CAMP, CAL.—Fire of mysterious origin destroyed the equipment of the Sultana Mining Company, with the exception of the 20-stamp mill, causing a loss of between $75,000 and $100,000.

SUSANVILLE, CAL.—The contract for paving the Richmond Road was awarded to the Warren Construction Company by the supervisors. The cost is approximately $25,000; the distance to be paved about 1,700 feet.

RICHMOND, CAL.—Iron oxide will be manufactured here as soon as a new building at Fifteenth and Chancellor can be completed. The plant is to be operated by a group of chemists formerly in the employ of the West Coast Calsomine Corporation at Berkeley.

RICHMOND, CAL.—Bids are being received by Architect L. F. Hyde, of Oakland, Cal., for various segregations of the construction of a one-story brick, concrete and glass factory building for the Republic Steel Package Company, to be built at Richmond, Cal.

SAN FRANCISCO, CAL.—The Meyenberg Milk Products Co. has been incorporated with a capital stock of $200,000 to establish a milk condensing business at Salinas. J. P. Meyenberg, for a number of years manager of the Alpine Evaporated Milk Co. plant at Gonzales, is president of the new company.

FOWLER, CAL.—The Frank H. Buck Co. of San Francisco, and 308 Mattei Building, Fresno, are to build a large green fruit packing house in Fowler. It will be on the railroad reservation adjoining the stockyards and south of the Armstrong warehouse. The building will be 150 by 67 feet, with a 16-foot porch running the full length of the building.

SAN FRANCISCO, CAL.—The California-Oregon Power Company has been granted an increase of 5 to 10 per cent over present schedules by the State Railroad Commission. Over 80 per cent of the power sold in California is delivered under contract to irrigation companies and to other power concerns, it was stated.

CARMICHAEL, CAL.—A committee of six voters is contemplating plans for forming an electric lighting district here. At a mass meeting to be held July 16th a definite plan will be launched. At present the irrigation district receives its power from the Great Western Power Company, but no current lines are nearer than the hop yards, two miles distant.

SAN FRANCISCO, CAL.—The Pacific Gas & Electric Company has given the contract for the forge welded steel pressure pipe for the Pit River No. 1 hydroelectric development to the M. W. Kellogg Company, of New York. The pipe, which will be 9 ft. in diameter at the upper end and 8 ft. in diameter at the lower end, and 1¼ inches thick, is to carry the water to the largest hydraulic turbines yet installed in the West.

REDDING, CAL.—A mortgage for $10,000,000 was filed for record here on July 10. It was given by the California Oregon Power Company to the Mercantile Trust Company of San Francisco as security for a loan. The mortgage covers all the company's property in Southern Ore-

gon and in Siskiyou, Shasta and Trinity counties in California. The California Oregon's wires extend as far south as Kennett, and as far west as Trinity Center and Carrville.

DIAMOND SPRINGS, CAL.—The box factory of the California Door Company at Diamond Springs, which recently was destroyed by fire, is rapidly being rebuilt in preparation for a heavy winter run of business making box shook. A carload of new machinery has arrived and is being installed. Enlargements of the mechanical part of the plant call for a 400-horsepower engine which is now being put in place. This plant when running at capacity furnished employment for several hundred men.

MODESTO, CAL.—The Modesto and Turlock irrigation boards at a meeting June 27 completed a contract with the San Francisco Iron and Metal Company, for approximately 500 tons of steel rails for the Don Pedro railroad, to be used in connection with the construction of the Don Pedro dam. The order calls for 56-pound rails, as approved by the Sierra Railroad. The directors practically have decided to carry their own compensation insurance on the project, in view of the fact that it would cost $75,000 to carry the insurance with the state.

SUTTER CREEK, CAL.—The concrete work at the tailings dam, located one mile west of the Central Eureka Mine, is more than half completed and the work is progressing well. The dam is over 1,000 feet long and has a concrete core with a sand filling above and below. A large crew of men is employed. The completion of the dam will insure safety to farm lands in the valley which heretofore were in constant danger of being damaged by the overflow. The work is being done under the supervision of Albion S. Howe, superintendent of the Central Eureka Mine at Sutter Creek.

PITTSBURG, CAL.—An important improvement in the Columbia Steel Roller Mill has just been made in the installation of a 1500-horsepower Westinghouse motor, built especially for roller mill service. There is said to be no other motor of this type west of Chicago. The cost of installation was $40,000, and by the use of this motor the 12-inch mill which it drives will be increased in capacity by 30 per cent. A remarkable feature of this motor is that it will stand an overload of 100 per cent for 13 minutes, thus enabling it to handle its work easily.

FRESNO, CAL.—Permit has been granted to the San Joaquin Light & Power Corporation, by the Federal Power Commission, for the following projects: Construction of a diversion dam and tunnel, 8 miles in length, to the proposed Kings River Power House; construction of a diversion dam in Roaring River and a tunnel 2½ miles to power house; construction of a diversion dam in Robbs Creek. All projects are to be on Kings River. The total development will be approximately 100,000 horsepower. One of the projects is below and two are above the proposed development of the city of Los Angeles on Kings River. The lower conflicts with the proposed development of E. B. Whitehall.

THE PACIFIC SOUTHWEST

HERMOSA BEACH, CAL.—Larger water mains and fire plugs are badly needed in this city, which was demonstrated at a recent fire. The board of trustees has the matter under consideration.

LOS ANGELES, CAL.—Under an order handed down by the State Railroad Commission, the Southern California Edison Company has been authorized to expend $5,058,860.56 of the proceeds of the sale of stock previously authorized to pay for plant extensions, additions and betterments.

ORANGE, CAL.—The California Wire Company, capitalized at $200,000, expects to begin the manufacture of electric wire and cable Oct. 1st. The purchase of a two and one-half acre site and the purchase of machinery have been authorized.

VENICE, CAL.—Santa Monica's commissioners have received bids for about $70,000 worth of water pipes for mains and hydrants. The bids have been turned over to the Commissioner for investigation, and the contract will be awarded later.

BALLINGER, TEXAS.—Engineers representing machinery and electrical supply houses are here making the preliminary survey for the city's $90,000 light and power plant. The bonds, which were voted recently, have been cashed and the city has the money in the bank with which to finance the new improvements.

LONG BEACH, CAL.—The Colonial Chocolate Company, whose plant at 1309-51 West Broadway was destroyed by fire, has taken a five-year lease on the building owned by E. E. Jones at 1181-87 West Ocean Boulevard, which will be completely remodeled and ready for use August 1st. A new 20-ton refrigerating machine will be installed.

SAN PEDRO, CAL.—After many months of negotiations, the agreement between the city and the Salt Lake Railroad over the widening of the main channel was signed by representatives of the railroad and the city. Prompt action in signing the agreement came as the result of the visit of the president of the Union Pacific here last week. The Union Pacific recently purchased the Salt Lake road.

SAN BERNARDINO, CAL.—In preparation to serve Big Bear Lake with electric current for power and lighting, articles of incorporation of the Bear Valley Utility Company were filed recently. The capital stock is $100,000. The incorporators are B. T. Ergenbright, president; E. E. Richardson, vice-president; E. S. Cole, secretary and treasurer; Frank L. Talmadge, all of Victorville. Mr. Ergenbright has the franchise to construct and operate a power line into Bear Valley. The same line will furnish the power for the operation of the Gold Mountain mills.

SAN DIEGO, CAL.—Under authorization of the state railroad commission, which recently granted application for issuance and sale of bonds to the amount of $2,750,000 par value, the San Diego Consolidated Gas & Electric Company soon will begin construction work on improvements and extensions on a large scale. Both gas and electric departments will be benefited by the work contemplated. A contract already has been awarded the Standard Iron Works of San Diego for the installation of an additional gas generating plant to cost $175,000, and the establishment of a complete purifying system. It is planned also to double the capacity of the electric power plant purchased from the Spreckels interests and increase the horsepower to 5,000. Three new, huge boilers will be installed, foundations having already been laid for them. An electric sub-station to cost $175,000 is another of the improvements contemplated.

THE INTERMOUNTAIN DISTRICT

LOGAN, UTAH.—As a result of a bond election held on June 7th a bond issue of $600,000 for road improvements has been decided upon. The money will be used for the improvement of roads in Cache county.

OGDEN, UTAH.—Contract for the construction of the new outfall sewer system of Ogden has been awarded to the Security Bridge Company of Billings, Montana. This company submitted the lowest bid, which was $351,010.58. The Security Bridge Company is ready to begin work immediately. The contract calls for the completion of the work in 400 days.

SALT LAKE CITY, UTAH.—A permit has been issued to Great Basin Power Company for the development of power on the west and north forks of Duchene River. The power plant will operate under a head of 480 feet and will develop about 4,000 hp.

LEVAN, UTAH.—The Levan town board has signed a contract with the Big Springs Electric Company of Fountain Green to furnish electric power. Work will be commenced very soon on the system, and it is expected that by fall the town will have an up-to-date lighting system and electric power for its various industries.

BOISE, IDAHO.—Contract has been let for the new portion of the Boise High School building. A. S. Whitway of Boise was the successful bidder, at $205,990, and guaranteeing completion of the work in 240 days. The Pope Electric Company received the contract for wiring, at $4,823. The bids on heating and ventilation were taken under advisement.

RENO, NEV.—Holding that the Reno Power, Light and Water Company had failed to show that the rates established by the Nevada Public Service were unfair, Federal Judge E. S. Farrington has dismissed a motion to enjoin the commission from enforcing its ruling. The case has been in process of adjudication for more than a year, and relates to water users in Reno and Sparks, and consumers drawing water from the Highland ditch system of the corporation.

SALT LAKE CITY, UTAH.—The Utah Reclamation Company has been incorporated, with the object of developing 630 acres of land lying about five miles west and north from Salt Lake City. The incorporators include A. A. Hinckley, state commissioner of agriculture; B. S. Hinckley, John Sommer of Ogden, and Matthew Baer of Tremonton, Utah, all of whom are directors, and also J. A. Robison of Salt Lake City. The company is capitalized at $100,000 in $1 shares.

BUHL, IDA.—The Hagerman irrigation project, known as the Blue Gulch, covering approximately 5,000 acres of land, recently passed under the control of James Bethel of Stanwood, Wash. The transaction involves a consideration of $250,000 and is being handled by Frank Roles and J. M. Richards of the Pacific agency. W. L. Blackwood of Buhl, who was the principal owner of the project, is accepting some scattered properties in Washington and Oregon as part of the consideration. Water rights for the entire project and the machinery and equipment of the irrigation system are included in the purchase.

SALT LAKE CITY, UTAH.—H. R. Waldo, of Salt Lake City, attorney for the Telluride Power Company, has made application to appropriate 100 second-feet of water from the Sevier river, in Sevier county, to be used for producing electric light and propelling machinery in Sevier, Piute, Sanpete, Millard, Beaver, Garfield and Iron counties. The water will be diverted from a point near the Telluride power plant, near Marysvale. It is said that the Telluride Power Company is seeking to obtain additional water power to be used in case of an increased demand for electric light and power in the counties named in the application, but that at present the demand is not large enough to warrant immediate development of power sources.

BOISE, IDA.—The Supreme Court of Idaho has handed down an opinion in which it holds the $2,000,000 bond issue authorized by the electors of Idaho to be legal, and giving the state treasurer permission to proceed with the negotiations for the sale of the bonds, employing, if necessary, a fiscal agent to dispose of them. The bonds are of twenty years' duration and bear interest at 5 per cent. The issue was authorized that necessary funds might be made available for the construction of good roads. An attempt made to sell them in January, 1921, failed because the highest bid was $84,424 below the par value of the issue. The last legislature appropriated $98,500 to bring the bonds up to a marketable figure and a case was instituted in the Supreme Court to determine their legality.

VOX POPULI

The following moving epistle was recently received by the manager of an English central station:

MOST IMPORTANT.

"Confectioner's Shop," 19, —— Street.
March 31st, 1921.

The Manager,
Electric Works.

Dear Sir, I Happen to live at the above address, and have A place of Business for which I find Rent and Rates are very heavy and I open my Shop all day on A Wednesday Every Week. There is no Half Holiday in my Business. And last night I was Without Light or Fire for A very Long Time, I have no Fire for any purpose Except Electric Light.

How Would you feel if you had been in my place Last Night. The pressure has been very poor for Heating purposes for A good While and Seeing how things are Even now Do you propose to Extend and Try to supply Electric Light and Heat for the new Houses on The Estate before you have Some means of giving A Better Supply to your present Customers. Just Think these matters over please, and I hope you will endeavour to let us have A Better Supply of Electricity and A Reliable Continuity, before you attempt to Supply a New lot of houses. If the Supply is So Feeble Now and Apt to Fail entirely What Would happen if you had more Customers to Supply. Please Try to prevent us being in the Dark in the Shop in Business Hours and Please Do Not Let us Freeze for Want of Electricity.

I hope you Can Manage at all times to let us have enough Electricity To Boil The Kettle. If not You may expect us to Come to Your house to Warm our Selves, See A Light and have A Cup of Warm Tea. There are Five of us here, and So your Family would be A Little Larger if we all come. And So for your Own Comfort Sake Perhaps you will Try Your Best To Comfort us with A good and Constant Supply of Electricity and oblige

Yours Respy.,
Mrs. L.

P.S.—There is plenty of Electricity in the Atmosphere. Get it and Send us plenty please and As Soon as you can Let us have it Cheaper Than it is. God will not Charge you anything at all for the Supply.

* * *

INTELLIGENCE TESTS

The series of questions propounded by Mr. Edison to his would-be employes has become famous overnight, and has met with widespread criticism as being irrelevant or impossible. Now, as for us, we are strongly in favor of plenty of general knowledge, especially for engineers, and suggest that all power company executives administer to their prospective employes a questionnaire somewhat as follows:

1. What is the amateur speed record in roller skating?
2. How many lobsters live in Booth Bay?
3. What is the highest building in Zamboanga?
4. What is the chemical composition of Mulligan stew?
5. How old was Homer when he died?
6. What is the mean temperature of a cup of coffee?
7. Who was the first man to eat pumpkin pie?
8. How many revolutions per minute are made by a dog chasing his tail?

For employes who commute we would suggest that an extra observation and memory test be added as follows:

9. Which shoe do you put on first in the morning?
10. What streets do you cross on the way to work?
11. Where is the nearest fire alarm box to your house?
12. What is printed directly under the name of your morning newspaper?

* * *

The early bird isn't in it any more. It is the electrical expert who catches not only the first worm, but as many worms as he wants. The ten-year-old son of J. H. Siegfried of the Pacific Power & Light Company believes in the electrical labor-saving idea, and when he wants angle worms for bait he inserts two electrical terminals in the ground some distance apart, connects them up and presses the button. The worms, disturbed by new and strange sensations, promptly seek the upper air, where Siegfried Junior collects them at his leisure. It is reported that a similar method is employed to bring forth from the soil of the Siegfried back yard, nourishment for the Siegfried chickens.

* * *

THE BUDDING SCIENTIST

Q. What is HIO?

A. Idiotic Acid.

An icicle is a piece of stiff water.

Oxygen is used to restore sick people being delivered in cylinders.

An element is a single kind of matter which cannot be separated by human nature.

Iodine occurs in a weed known as fluorspar, which grows in Iceland.

Sodium occurs more in Nature than elsewhere.

* * *

ELECTRICAL HYBRIDS

VII — The Electric Arc-itect

The Arc-itect, though sometimes loud,
Is usually bright,
And on your building problems
He can throw a deal of light.

He has the artist's temperament
And frequently gets hot;
He is brilliant when he's heated
But quite lifeless when he's not.